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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Fast Scoring

It took only two minutes to find out who had been voted the Most Valuable Player in the National Basketball Association's All-Star Game. See story on Page 5.

DP Salaries Show Strong Jumps

Starting Salaries Up 7.3% Over 1978

By Marcy Rosenberg
CW Staff

NEW YORK — Starting salaries for DP professionals will hover at record levels this year and show a 7.3% average jump over 1978 figures.

Salaries for operations managers at large installations will show the greatest gains, climbing 15.9% to between $20,000 and $27,500 from last year's $16,000 to $25,000 range.

These figures are based on a nationwide study conducted by Robert Half, Inc., a DP and financial executive personnel consulting firm that examined about 15,000 personnel requests submitted by clients.

Generally, both management and nonmanagement salary levels correlated directly with installation size, according to the study, which classified the size of installations sampled by major computer system and number of employees.

(Continued on Page 6)

Managers Last Year Averaged $25,000

By Ann Dooley
CW Staff

WILLOW GROVE, Pa. — DP managers at utilities earned up to $5,000 more on the average in 1978 than DP managers in other industries, and DP managers in the southern and western regions of the U.S. were paid up to $1,500 more than their counterparts in the East and the Midwest, according to a recent Administrative Management Society (AMS) survey.

The average annual salary for a DP manager in the U.S. was $25,000.

DP salaries for the country as a whole substantially varied from one job category to another, the survey found.

While DP managers in utilities earned the highest average salaries, managers in sales and distribution earned the lowest. Utilities paid their DP department heads $28,100 on the average, nearly $3,000 more than the

(Continued on Page 8)

Managers' Wages Tied To Installation Size

By Marcy Rosenberg
CW Staff

OAK BROOK, Ill. — DP salaries at the management level depend largely on computer installation size; for nonmanagement positions, salaries usually increase as individuals gain professional experience.

This was one of the findings of the 1979 National Computer Salary Survey, just released by Source EDP, an industry placement bureau.

The survey includes median annual salary figures for four management and five nonmanagement DP position categories. Data was gathered from about 25,000 individual clients and more than 14,000 client organizations.

Management salaries directly correlated with installation size, which Source EDP defined as follows: "small" installations use systems smaller than IBM's 370/125; "medium" installations have systems ranging in size from the 370/125 to the 370/145; and "large" installations use systems bigger than the 370/145.

By these definitions, the national median salary for systems and programming managers last year was $32,700 in medium installations and $35,800 in large installations, the survey found. Comparable 1977 figures were $30,900 in medium and $33,700 in large installations.

Operations managers working in medium installations earned a $24,300 median salary, while those in large installations earned $29,900 last year. These figures show an increase from

(Continued on Page 6)

Penalties for Fraud Stiffer

Senate Gets DP Crime Bill Again

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Federal Computer Systems Protection Act, known in the 95th Congress as S. 1766, has been reintroduced in the Senate with a number of revisions suggested by the Department of Justice and computer security experts.

The major change in the bill is a stiffer penalty for computer fraud. The legislation now calls for fines of up to two and one-half times the amount lost.

According to its sponsor, Sen. Abraham Ribicoff (D-Conn.), the bill would make "virtually all unauthorized use of federal computers and computers used in interstate commerce a federal offense."

The original version of the bill called for a maximum fine of $50,000. In reintroducing the legislation on Jan. 25, Ribicoff noted that "computer crimes against corporations result in a staggering average loss of $621,000," indicating the need for increased monetary penalties.

Now designated S. 240, the bill was referred to the Senate Judiciary Committee, whose Subcommittee on Criminal Laws and Procedures will first consider the legislation. It will receive prompt attention, subcommittee chief counsel Mark Gitenstein said.

The main section of the bill makes it a federal crime to "knowingly and willfully access" a computer "for the purpose of perpetrating fraud or obtaining money, property or services under false or fraudulent pretenses," Ribicoff explained here last week. Not only would such crimes subject the perpetrator to a fine of two and one-half times the amount of the fraud or theft, he would also be subject to a prison term of up to 15 years or both.

Under the provisions of S. 240, "there would be no requirement that telephones or other forms of illicit computer penetration across state lines

(Continued on Page 4)

Carter's 1980 Budget Calls For Significant Hikes in DP

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Used effectively, DP should enable government agencies to function better. That is why the Carter Administration's proposed budget for Fiscal Year (FY) 1980 has sharper increases in DP funding than for most other activities, according to a spokesman for the Office of Management and Budget (OMB).

The obligations for general-purpose DP activities in federal agencies are expected to increase $651.4 million from FY 1978 to FY 1979 and by another $492.4 million from FY 1979 to FY 1980, he said. Those jumps will bring the total commitment for DP to $4.77 billion in FY 1979 and $5.26 billion a year later, OMB estimated.

Fiscal Year 1979 ends Sept. 30, 1979 and FY 1980 begins Oct. 1, 1979.

The growth rates represented by the dollar increases — 15.8% and 10.3%, respectively — are "significantly higher" than the 9.4% and 7.7% growth expected in the overall federal budget in those years. The payoff from those higher expenditures should be better

(Continued on Page 6)

IBM Remedies Series 30 Ills

By Jay Woodruff
CW Staff

NEWTON, Mass. — The problems with malfunctioning channel directors in IBM 3032 and 3033 mainframes have been cleared up, and machines delivered by November were free of the trouble, according to users surveyed recently.

Users of mainframes — usually with low serial numbers — complained of the problem last summer [CW, Aug. 21]. However, many were quick to point out that, outside of any director malfunctions, they were impressed by

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'Major Defects' Cited

Federal DP Job Standards Panned

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Proposed new classification and qualification standards for federal DP personnel have provoked a storm of criticism from both government and non-government DPers here.

One Federal computer specialist called the proposal "a horrible document" that will make it "impossible [for government DP facilities] to hire competent people."

Citing "major defects" in the standards, an ad hoc panel of DP professionals said "the tentative standards so inaccurately reflect the realities of computer occupations in the marketplace that it would be better to keep the old standards," now more than 10 years old.

In the face of this mounting criticism, the Office of Personnel Management (OPM) — formerly called the Civil Service Commission — said it will go back into the field for more research and will probably issue another draft of the personnel standards, taking into account the large number of comments being received.

"We'll no doubt make a lot of changes in the content of the standard," according to David Gilmore, a personnel management specialist in OPM's Standards Division. Gilmore is the author of "Tentative Standards for Computer Specialist Series," the classification of government DP personnel that includes programmers, programmer analysts and systems analysts.

OPM has concurrently proposed revisions in the "Computer Clerk and Assistant Series," which covers such occupations as coding, keypunching and tape library maintenance.

'Sloppy Job'

Both sets of standards have been criticized as not reflecting the current state of DP in the U.S., being based on obsolete and inaccurate terminology, offering noncompetitive pay scales and threatening widespread downgrading of existing federal DP positions.

"It's just such a sloppy job," one federal DPer, who asked not to be identified by name, said. "Having a poor standard means it's almost impossible to hire competent people when you go out to the marketplace."

The low pay scales reflected in the proposed standards would make it "more and more difficult" to recruit first-rate DP professionals, he added.

However, OPM's Gilmore, remarked, "we're a little bit hamstrung when it comes to pay." A 1949 law mandates that "GS5 will be the entry level for professional positions," he said.

Entry-level GS5 salary is now about $10,500 and "currently that's not a devil of a lot." It is a grade shared by "a lot of low-level secretaries," he noted.

"Now that is pretty cheap, particularly in some parts of the country; in these high-cost-of-living, urban areas, that's mighty cheap," Gilmore conceded.

A panel of experts brought together by the American Federation of Information Processing Societies (Afips) recommended that the tentative standards "not be implemented until the defects in them have been corrected." The proposals "are weak in failing to take into account changes in the field during the past five years and in inaccurate use of terminology in numerous places."

Throwback to Batch

Discussing the panel's recommendations, Alexander D. Roth, director of the Afips Washington office, said the proposals "do not even accurately reflect the way the industry was five years ago. Generally they look at a batch environment."

They do not take into account "the advanced positions like data base administrator, the recent development of the computer security analyst, the chief programmer/team concept, top-down design and development, functional isolation and structured programming, development and testing," he added.

A recent survey found there are "characteristically an extraordinary number of overgraded jobs" in the DP classifications, Gilmore said. He anticipates "some adverse impact" on pay levels, but "it is not our intent to cut people off at the knees," he said.

"Let us know if we're being unfair," he urged.

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Fraud Penalty 'Overkill'?

DP Community's Feelings on Crime Bill Mixed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Representatives of the DP community have expressed mixed feelings about the current version of the Federal Computer Systems Protection Act, reintroduced in the Senate Jan. 25 by Sen. Abraham Ribicoff (D-Conn.).

While participants in a meeting of the Electronic Funds Transfer Association (EFTA) here last week praised the legislation's increased penalty for major computer fraud, several said the bill should also provide a misdemeanor charge for lesser acts of unauthorized access of computer systems.

The consensus was that the bill — which would make all unauthorized access a federal crime punishable by fines up to $50,000, 15 years in prison or both — amounts to overkill and could discourage reporting of minor infractions of the law.

Timothy G. Donovan, director of industry communications at the Computer and Business Equipment Manufacturers Association (Cbema), said his association feels a possible misdemeanor charge for minor computer crimes would lead to increased reporting of such infractions. Such reporting is necessary to "catch these perpetrations before they become major scandals," he added.

No Innocent Activity

Philip R. Manuel, an investigator for the Permanent Subcommittee on Investigations of the Senate Committee of Government Operations, told the EFTA meeting the Senate would consider adding a misdemeanor charge, but said the law, which he helped draft, encompasses the belief that "unauthorized access to a computer is not innocent activity," no matter how harmless the intent.

Such "innocent activity" — keeping track of the office football pool, for example — could lead to a major fraud, according to Manuel. Stopping such activity is "the key to stopping major crimes."

The law was designed as a prosecution tool and not as a method for policing DP operations, he reminded the meeting.

Agreeing with Manuel, Mark Gitenstein, chief counsel of the Senate Subcommittee on Criminal Laws and Procedures, which has jurisdiction over the legislation, said the bill is "an important first step, but just that — a first step." The legislation may undergo a number of changes before it gains subcommittee approval, he indicated.

Also raised at the EFTA meeting was the point that because the bill calls for prosecution of acts of "unauthorized access," it will be necessary to define what exactly is authorized and what is not. This could result in private individuals and corporations deciding what constitutes a crime, which may be unconstitutional, meeting participants noted.

Manuel thinks the reliance on "prosecutorial discretion" called for by the legislation will be sufficient protection against a felony prosecution for activities constituting only minor or technical infractions of the law.

It was also suggested that the bill's language be amended to preclude access to data bases and data files but not to "computer systems." The bill's current language would not allow a programmer to increase his proficiency because he would be limited to working only on those projects for which he has already shown a capability, proponents of the suggestion explained.

Worth the Price?

Moving beyond concerns about the language of the bill and the methods of prosecution it affords, Roaland R. Eppley Jr., president of the Eastern Bankcard Association, said there may never be an economical way to deter computer crimes. He cited the large turnover of programmers and the chaos caused by systems that come up late and are constantly being modified as factors preventing the application of adequate audit and security controls to stop such criminal activity.

A knowledgeable programmer can get away with almost any crime, leaving a trail almost — if not totally — impossible to follow, Eppley maintained. Computer auditing is in the "horse and buggy stage" right now, he said.

Moreover, he added, adequate computer auditing techniques might be more expensive than the loss incurred through an occassional computer fraud.

Accidental Discovery

Agreeing with Eppley, Dr. Edward H. Coughran, director of the computer center at the University of California at San Diego, noted that most computer crimes are discovered by accident and that prosecution of computer crime is hindered by management as well as by a lack of zeal or prosecutorial tools on the part of law enforcement.

A misdemeanor charge might not be effective at all, he said, because embarrassed organizations would be unlikely to report a large number of infractions, no matter how minor.

Such crimes often point out "the holes in our procedures." Lengthy prosecutions are "not a very cost-effective process," and it sometimes makes more sense to management to merely "fire the individual and plug the hole," Coughran said.

Ribicoff Reintroduces Bill

(Continued from Page 1)

be used in order to qualify the act as a federal crime," the senator noted. "The bill is further intended to ease the jurisdictional and evidentiary burdens posed by computer technology on federal prosecutors and law enforcement personnel.

"This bill is specifically designed to give federal prosecutors a weapon against the four main categories of computer crime," he added, citing them as:

- The introduction of fraudulent records or data into a computer system.
- The unauthorized use of computer-related facilities.
- The alteration or destruction of information or files.
- The theft by electronic or other means of money, "financial instruments" such as checks and credit cards, property, services or "valuable data."

Ribicoff hopes the new version's increased penalties, "unprecedented in federal criminal law for white-collar crime, will deter the potential computer thief and at the same time pose a warning to all white-collar criminals that the Congress of the United States sees white-collar crime as a threat to our society which should be dealt with in a manner befitting the crime."

Noting the heavy dependence of banks on computers and the growing use of electronic funds transfer, Ribicoff said the bill also places "particular emphasis on the prosecution of crimes against the computer systems of banks and other financial institutions which are insured or regulated by the federal government.

Aid to Prosecutors

"If adopted," the senator said, "this bill would be the first law enacted by Congress aimed directly at controlling crime by computer or computer-related crimes."

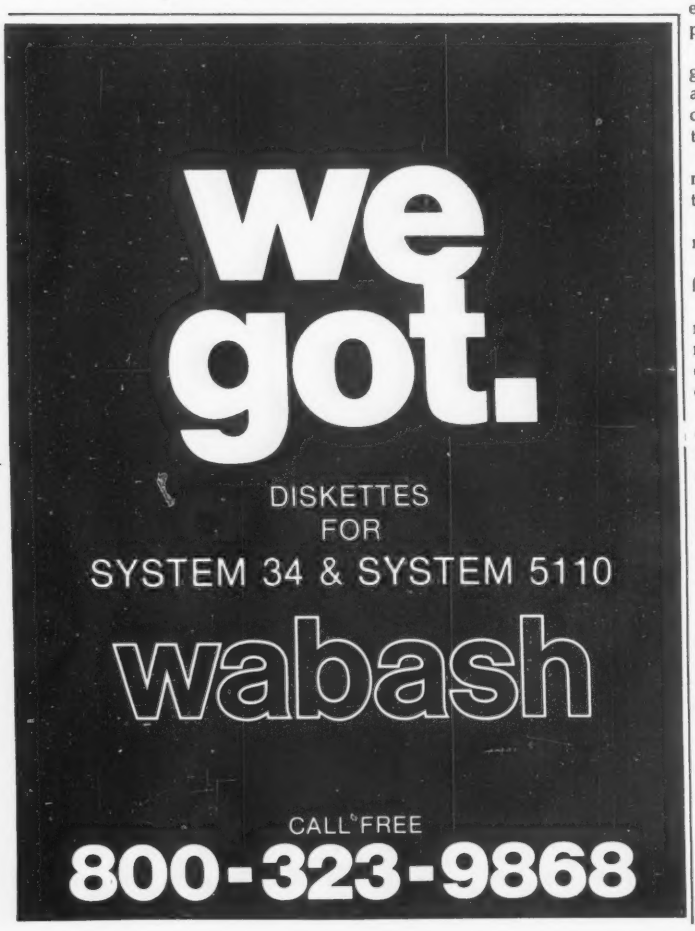
While federal law presently "contains some 40 sections which the government can use to combat computer-related crime . . . all 40 of the statutes were written to combat abuses other than computer crimes. As such, federal prosecutors have been handicapped because they have had to construct their cases on laws that did not envision the technical aspects of computer crime."

The legislation resulted from a one-year investigation, concluded two years ago, conducted by Ribicoff's Government Affairs Committee. The inquiry found the government unable to "adequately secure its 10,000 computers against fraud, compromise and physical assault," uncovered a weakness in government procedures for "predicting the integrity of its computer personnel" and saw a desire by law enforcement officials for stronger and more specific statutes for prosecuting computer crime, Ribicoff said.

S. 240 has already garnered a strong, bipartisan backing with such influential co-sponsors as Senators Edward Kennedy (D-Mass.), Harold (Scoop) Jackson (D-Wash.), Ted Stevens (R-Alaska) and Charles Percy (R-Ill.). Percy is the ranking minority member of the Senate Government Affairs Committee.

In introducing the bill last month, Ribicoff also noted it has received the support of the Department of Justice, the Federal Bureau of Investigation, the General Accounting Office and "several former U.S. attorneys."

Nine of 10 suggestions from the Justice Department's Criminal Division have been incorporated in the new version of the bill. These changes not only more clearly define what constitutes a computer system, but also state that acts prosecutable as computer crimes must be willful attempts, not necessarily successful, at unauthorized access.



Bill Penalizes Innocent Unauthorized Access

By Jake Kirchner
CW Staff

WASHINGTON, D.C. — Although the Federal Computer Systems Protection Act now says illegal access to computer systems must be "knowing" and "willful," the new version of the bill does not exempt any "innocent" or "noncriminal" unauthorized access, a point which dismayed DP industry representatives who testified on the bill last summer.

Addressing noncriminal but unauthorized access, Sen. Abraham Ribicoff (D-Conn.) — who reintroduced the bill late last month — told his colleagues: "Some persons have said the trespass and 'browsing' control section of the computer bill is too broad, that it would make it a federal offense for harmless activities at the computer console, such as making a Snoopy calendar or filing away and tabulating bowling league scores and standings."

But, he said, "the same type of browsing" which creates a Snoopy calendar "could facilitate a major fraud or a serious act of intentional destruction."

The bill, filed as S. 240, is similar to the Wire Fraud Statute in its reliance on the discretion of federal prosecutors in the application of the law, he pointed out.

"The Wire Fraud Statute would technically allow the federal government to prosecute anyone who uses a slug to make an interstate telephone call from a phone booth. That does not happen because prosecutors would not waste their time on such matters. But, nevertheless, the discretion to prosecute remains. The same principle holds in S 240."

Protecting Federal Facilities

Addressing the subject of computer security in federal programs, Ribicoff said "we must decide whether we truly wish to secure federal facilities and data. Are federal [DP] equipment and facilities purchased and leased at enormous sums of money and vested with huge volumes of information to allow programmers and other support personnel the opportunity to 'fool around' by making calendars and maintaining bowling league scores? I hope not.

"If we are to succeed at protecting federal [DP] facilities and programs against fraud, intentional destruction and unauthorized access, let us do it and not be persuaded to dilute our efforts to convenience personnel who have become accustomed to utilizing the computer in an unauthorized way."

Ribicoff said he was furtner persuaded of the need for such stringency by a Jan. 17 letter from U.S. comptroller General Elmer Staats that cited a "major computer compromise at the Department of Agriculture," which demonstrated "the need for passage of the Federal Computer Systems Protection Act."

According to an October 1978 report from the Inspector General's Office of the Department of Agriculture, "Department employees using remote terminals gained unauthorized access to computerized government data on file at [Agriculture's] Washington computer center more than 6,400 times in a recent 12-month period, an average of 17 times a day for 365 days," Ribicoff reported.

Staats told Ribicoff that no prosecutions or other legal actions were initiated, but "had [S. 240] been enacted and in effect at the time these activities had occurred, there would have been a clear case for legal steps against the perpetrators, as their actions would have been covered," the senator noted.

Mini Tabulates MVP Votes Fast

By Jay Woodruff
CW Staff

PONTIAC, Mich. — With one minute to go in the National Basketball Association's All-Star Game here at the Silverdome two Sundays ago, about 300 sportswriters and broadcast sports announcers cast ballots for the game's Most Valuable Player (MVP) award. One minute after the game ended, a Honeywell, Inc. Level 6 Model 33 minicomputer had tabulated the vote and showed guard David Thompson the winner.

CBS-TV covered the game and focused on one of the system's two 24-inch CRT screens as they projected the results of the balloting.

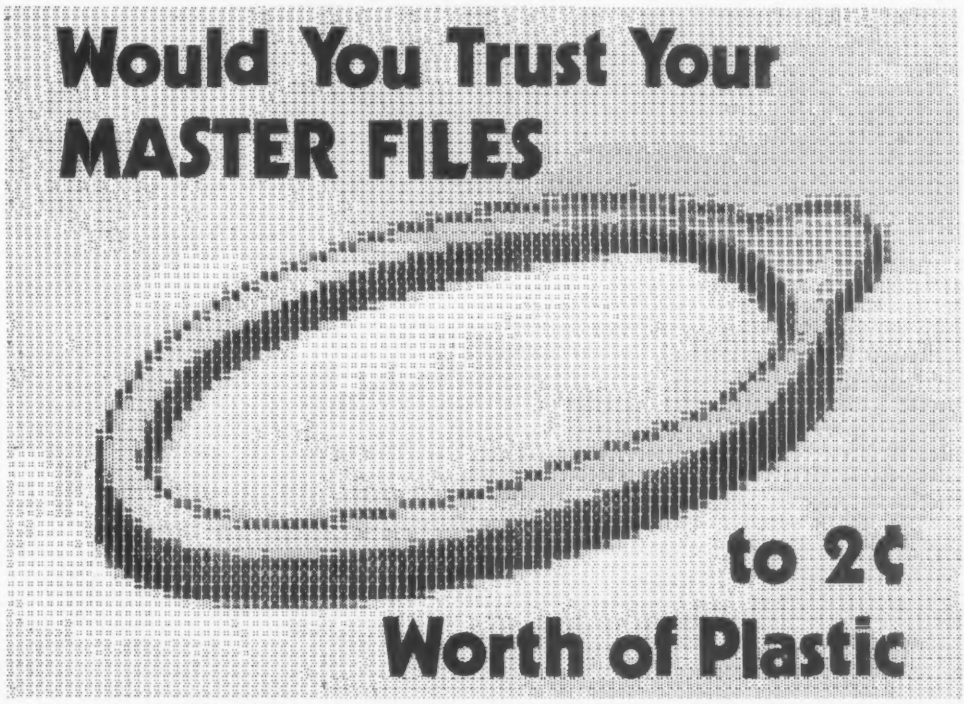
First used last year so voters could wait longer before making their choices, the system is an improvement over the old one. With the old system, voters had to cast ballots very early, eliminating consideration of most of the fourth quarter.

Thompson, who scored 25 points, garnered the award before the largest crowd ever to watch an All-Star game — 31,754 spectators, almost double the record set 11 years ago in New York.

Twenty Honeywell terminals were placed in blocks of five close to the voting writers and broadcasters. Each voter had two packets, one for the East and one for the West.

Inside the packets were cards for each player, with the player's name preprinted on the card. A voter had merely to select the card of his top choice and hand it to a volunteer, who rushed it to the nearest terminal, equipped with a 300 card/min reader.

The Honeywell system had 128K bytes of memory and 10M bytes of disk storage and used VIP 7200 consoles.



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cw2/12

Carter Budget Calls for Higher DP Spending

(Continued from Page 1)

systems, leading to quantifiable dollar savings, the spokesman claimed.

To back that claim, OMB released a series of case studies of systems recently put in place, some of which have already produced measurable savings and others, nearing completion, for which savings forecasts are available.

In the introduction to that document, the budget office said taking advantage of computer technology should help "provide better service to the American public, expand the capability and productivity of the federal work force without expanding its size, improve the management of federal agencies and programs, reduce fraud and waste in federal programs and reduce the cost of government."

Defense Comes First

The figures cited by OMB in its budget recap refer to direct costs within the agencies for general-purpose DP work. This includes the cost of people, equipment and outside services, but excludes DP activities funded by federal grants, classified systems or computers that are integral parts of weapons, space or similar systems.

Even with those exclusions, the Department of Defense is in line for the largest dollar increase in a DP budget, rising a whopping $666.7 million in the two-year period covering FY 1979 and FY 1980. That 34.4% increase means the department is committing an estimated total of $2.6 billion to DP in FY 1980.

Joseph Califano's Department of Health, Education and Welfare is slated for a $99 million — 23% — increase in its DP budget in the same two-year period, reaching $529 million in FY 1980.

Third-ranked in terms of absolute growth in DP activities, the Department of Energy expects to add $74.6 million to its budget for DP, a 26% increase that will lead to a $351 million total in FY 1980.

The Department of the Treasury is next in line, slated for a $65.3 million increase in the two years considered in the recap. That 12.5% jump will provide a $586.2 million budget in FY 1980, the report showed.

Only three of the 20 departments and agencies pinpointed by OMB are slated for decreases in their DP budgets in the 1980 fiscal year. The General Services Administration, with DP "resources" of $60.7 million in FY 1978, is expected to drop to $53.5 million in FY 1979, then rise — but to only $55.2 million — in FY 1980.

The Veterans Administration is slated for a wilder fluctuation, from $80.5 million in FY 1978 to $74.9 million in FY 1980, but with a spike to $113.4 million in FY 1979 — presumably reflecting the costs of implementing the Target system for improving the delivery of services to veterans.

The only other downturn on the OMB's list is a very slight drop in the Office of Personnel Management, from $12.5 million to $12 million.

Starting Salaries Near Record This Year

(Continued from Page 1)

Researchers called installations "small" if they have less than 20 employees and use systems equivalent to or smaller than the IBM 370/125. "Medium" installations use 370/135, 145, 148 or equivalent equipment and employ between 20 and 25 persons, while installations with more than 25 employees and larger computer systems than the 370/148 were termed "large."

Programmers' Salaries

The study examined various DP job categories for each size installation. In large installations, programmers with up to one year of experience will be offered salaries 9.4% higher this year. These will range from $13,500 to $15,500, compared with 1978 starting salaries of $12,000 to $14,500.

Medium installations will offer beginning programmers salaries ranging from $13,000 to $14,500, an increase of only 1.9% from 1978 figures of $12,500 to $13,500. Salaries at small installations, however, will rise 8.7% to between $11,000 and $14,000 from last year's $10,000 to $13,000.

Programmer/analysts can expect to earn 5.3% more at large installations this year. Starting salaries will range from $17,500 to $22,500 compared with $16,000 to $22,000 last year, the study found.

This year, medium installations will pay 9.9% more for individuals in this job category — between $17,000 and $22,000 — while small installations will offer salaries ranging from $14,000 to $17,500, a 5% increase over 1978.

Rises for Systems Analysts

The going rate for systems analysts in 1979 will increase 12.2% to between $20,000 and $26,000 at large installations; 5% to the $19,000 to $23,000 range in medium installations; and 11.6% at small installations to the $17,500 to $21,000 level, the study predicted.

In addition, the study cited several factors that will further boost starting salaries for these three job classifications. Any undergraduate degree will push salary levels up another 5%, as will substantial travel requirements.

Furthermore, large and medium installations will usually add 10% to stated starting salaries if the applicant has an accounting degree.

At the management level, DP directors can expect to earn 12.1% higher starting salaries at large installations and 13.7% more at medium-size sites. The study pegged salary ranges at $29,000 to $45,000 and $25,000 to $33,000, respectively.

With a relevant graduate degree, these job applicants can pull an additional 10%, the study noted.

Small-installation DP managers will start at salaries between $20,000 and $27,000, 6.8% more than last year, according to the study. Graduate degrees alone will earn an applicant an additional 10% to the base starting salary and an extra 12% if coupled with an accounting degree.

Based on the data collected, researchers noted certain trends. For example, large firms usually pay higher starting salaries than small and medium-size companies. The reason is that, historically, the larger the firm, the larger its per capita budget, according to Martin Amato, DP placement manager at Robert Half.

Small and medium-size companies, however, tend to offer more rapid advancement opportunities for selected employees than do larger organizations.

The "1979 Financial and Data Processing Prevailing Starting Salaries" study is available at no cost from Robert Half, 522 Fifth Ave., New York, N.Y. 10036.

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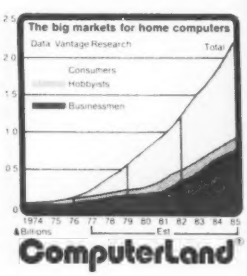

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Wages, Site Sizes Linked

(Continued from Page 1)

the previous year's medians of $23,300 and $28,200 in medium and large installations respectively.

Similarly, information systems directors earned more in 1978 than in 1977. Last year's median salary was $29,200 in small installations, $34,400 in medium ones and $43,400 in large ones. Comparable 1977 figures were $26,700, $33,600 and $38,500.

Nonmanagement Salaries

Turning to nonmanagement salaries, the survey found a direct correlation with an individual's amount of professional experience.

Last year, commercial programmers and programmer/analysts with six months to one year of experience earned a median salary of $14,900. Salaries increased to $16,700 with one to two years of experience; to $19,000 with two to four years; to $21,600 with four to six years; and to $23,700 with more than six years. Comparable 1977 findings were $13,700, $15,600, $17,800, $20,400 and $21,600, respectively.

Systems (software) programmers with one to two years of experience earned a $19,700 median salary in 1978 which rose to $28,400 with more than six years' experience. The 1977 figures for comparable tenure were $17,300 and $25,800.

Source EDP's highest level nonmanagement category grouped together senior analysts, project leaders and consultants. Median salaries ranged from $22,500 with two to four years' experience up to $28,200 with more than six years, compared with $21,400 and $25,900 for similar tenures in 1977.

Reason for Trend

Nonmanagement salaries depend on experience, the survey said, because the initial levels of responsibility — programming, programming analysis and systems analysis — provide the basic training and exposure needed to understand the capabilities of the computer as a control tool.

Therefore, individual career success at these levels "is almost exclusively dependent on the degree of technical competence mastered and exhibited."

As DPers step up the career ladder to the project leadership level, the ability to communicate and to organize, motivate and direct the efforts of other professionals becomes just as important as technical competence, Source EDP noted.

The survey is available to the general public free of charge from Source EDP at 721 Enterprise Drive, Oak Brook, Ill. 60521, or from any of its regional offices.

Tops '79 by $379 Million

Carter Keeps Promise: More R&D Funds in '80

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Unveiling his "lean and austere" budget for fiscal year 1980, President Carter delivered on his promise to the scientific community of a continued commitment to research and development.

The $532 billion budget — representing an increase of $38 billion, or 7.7%, over 1979 — singled out certain electronics R&D areas as exceptions to Carter's "policy of restraint" in determining the massive expenditures proposed for 1980 government spending.

Increases in R&D support in the budget are said to reflect Carter's belief in the need for increased R&D in this country. Daniel C. Atkinson, director of the National Science Foundation (NSF), recently noted that the President has not only instituted a review of industrial innovation in this country, but on several occasions specifically exempted R&D expenditures from his call for government budgetary cutbacks to fight inflation [CW, Dec. 11].

"This support," Carter said, "amounts to a relatively small part of the total budget — $4.6 billion in 1980 — but it is vital to the future of our nation." This figure represents an increase of $379 million, 9% above the 1979 dollar level, or about 2% real growth.

In addition to its support for basic R&D, the Administration proposed to spend $29.6 billion in fiscal year 1980 for R&D carried out by various federal agencies and departments, an increase of almost $2 billion over the amount budgeted for that purpose the previous year.

Department of Defense (DOD) outlays for R&D, pegged at $13.8 billion in the new budget, would account for approximately 45% of total federal R&D support, far greater than any other federal agency's allotment. Obligations were estimated to increase by $882 million, or 7%, over 1979.

While the bulk of those funds would go for the development of "major strategic and tactical weapons," DOD plans to emphasize "a new initiative" in research on very large-scale integration for defense applications, according to the budget document.

It was estimated that 1980 expenditures for R&D by the National Space and Aeronautics Administration (Nasa) will total $4.5 billion, $148 million more than in 1979.

NSF, which the budget notes "is of particular importance among federal agencies in its support for basic research," would spend $910 million for R&D during the fiscal year, an increase of $91 million, or 11%, over 1979's expenditures of $819 million. Funding for basic research programs would increase from $741 million to $828 million, or about 12%.

One of the "highlights" of proposed NSF funding is "a major initiative in the science and fabrication of microstructures, an area of considerable potential value to industry in fields such as electronics and computers."

DP Jobs Top Exemption List

By Marcia Blumenthal
CW Staff

WASHINGTON, D.C. — Virtually all of the applications to the Council on Wage and Price Stability (Cowps) for exemptions from the 7% ceiling on wage hikes because of acute labor shortages have been from companies experiencing crunches either in hiring or retaining computer specialists or electrical engineers.

Cowps has not yet approved any of these exemptions because the applicants have not provided the complete documentation necessary, according to Sean Sullivan, assistant director for pay monitoring at Cowps. Job categories for which employers can document labor shortages can be exempted from President Carter's request that salary increases be held to 7% [CW, Dec. 25-Jan.1].

To date, the council has received about 20 applications for exemptions because of labor shortages, Sullivan estimated, with those requests evenly divided between computer specialists and electrical engineers. Cowps is currently processing about 40 to 50 applications for all situations qualifying for exemptions.

"We weren't sure whether the requests would flood in or come in gradually," Sullivan said," but up until now it's been gradual. From what I have heard informally, we expect a good number to come in during February."

Cowps has said it will make its decision on whether to grant a company an exemption within 20 working days of receiving an application. However, the 20-day period begins after all the necessary information has been submitted.

Firms can apply for an exemption at any time they determine they suffer labor shortages. There is no deadline for such applications. The council's widely reported Feb. 15 deadline is for large companies that must demonstrate to Cowps they are in compliance with President Carter's wage and price guidelines [CW, Jan. 29].

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DP Managers Earned Average $25,000 in '78

(Continued from Page 1)

runner-up category, banking, insurance and financial institutions, which paid their DP managers an average $25,200 per year.

A category called "other types" of businesses, which included jobs related to government, education, medicine and employment, came in third, with DP managers earning an average $25,000 for the year.

DP managers in manufacturing/-processing companies earned the next to the lowest salaries with an average $24,900, while sales and distribution firms ranked fifth, offering an average DP managerial salary of $23,000.

Geographical Breakdown

In a geographical breakdown, the salaries of DP managers in the South and the West tied for first place, with managers in both areas earning an average $25,700 as of Sept. 1, 1978, when the survey was done. In the East, DP managers reported earning $25,000 for the same period.

Those in the east-central and west-central sections of the country garnered an average $24,400 and $24,200 respectively.

Overall, salaries for DP managers throughout the country averaged $25,000, showing a 6.8% increase from the $23,400 average salary for DP managers reported by AMS for 1977. Salaries for Canadian DP managers were also assessed at $25,000 on the average for all types of businesses, according to the survey.

When salary figures from geographic areas were broken down by job category, amounts corresponded to overall U.S. averages in the east and west-central parts of the country, but varied from the countrywide averages in the east-central, south and west segments of the nation.

In the east-central U.S., utilities offered the most generous salaries, an average of $28,500. Manufacturing/-processing firms in this section of the U.S. ranked second; they paid their DP managers an average salary of $26,100.

In third place was the banking, insurance and financial firms category, which paid an average $23,900 yearly salary to DP managers.

Sales and distribution ranked fourth, with DP managers earning $22,800 a year. "Other types" of business ended up last. DP managers in this group earned an average $22,500 a year.

Southern Western Salaries

In the southern U.S., DP managers working for utilities again earned the highest annual salaries, averaging $29,700. The next highest salaries were paid by "other types" of businesses, whose DP managers earned $27,600. Manufacturing/processing firms' salaries for DP managers ranked third.

Fourth were DP managers in the banking, insurance and financial category, with salaries of $23,900. Sales and distribution firms ranked last; they paid just $21,600.

In the west, the banking, insurance and financial firms were ranked as the highest paying with DP managers earning an average $27,900 annually. Utilities came next; they paid their DP managers $27,200.

"Other types" of businesses, with $25,800 for average earnings among DP managers, ranked third. Manufacturing/processing firms which paid managers $25,400 last year, came in fourth. Sales and distribution firms ranked fifth with an average salary of $22,500 for its DP manager.

Dollar Amounts Differed

Although rankings according to job category in the eastern and west-central parts of the country corresponded to the countrywide rankings, actual dollar amounts earned by DP managers in these portions of the country differed from the national average.

In the east, DP managers' salaries in utilities were $27,500; in banking, insurance and financial institutions salaries were $26,000; salaries in "other types" of businesses averaged $24,500; and in the sales and distribution category, managers earned $24,100 on the average.

DP managers in the west-central U.S. earned $27,900 in the utilities industry, $26,000 in banking, insurance and financial firms, $24,000 in "other types" of business, $22,800 in manufacturing/processing companies and $22,700 in the sales and distribution category.

Major Market Cities

In major DP market cities, DP managers salaries widely varied. In the eastern U.S., Boston DP managers earned average salaries of $23,300; in Hartford, Conn., salaries averaged $25,000; in New York they were $29,000; Philadelphia salaries averaged $24,700; in Washington, D.C. they were $26,800.

In the east-central U.S., salaries averaged $25,800 in Chicago and $25,700 in Cleveland. In the Minneapolis and St. Paul portions of west-central U.S., salaries averaged $29,000; in St. Louis, $24,700.

Atlanta's salaries in the South averaged $25,900. Salaries in Dallas were $31,300.

AMS surveyed 1,431 average-sized companies and obtained data from 1,771 DP managers in 108 major cities in the U.S. and Canada. The DP manager survey was only part of a larger survey of 20 managerial positions covering 63,449 managers in 3,169 companies.

The nonprofit professional management association obtained the data from member and nonmember companies in the U.S. and Canada. Its 40-page survey, "AMS Guide to Management Compensation, 1979," is available for $75 ($50 for members) from the Personnel Division, Administrative Management Society, Maryland Road, Willow Grove, Pa. 19090.

IBM Cures Series 30 Ills

(Continued from Page 1)

the systems' capabilities and high reliability.

A channel director provides common logic and control functions for groups of six and four channels. Complaints about their operation centered on a timing difficulty which put the director out of sync with the CPU. Some users reported difficulty keeping loads balanced on their disk channels.

OPM Leasing Services, Inc. reported that approximately 90% of its leased 3032s delivered in the first six months the system was available had director problems, but all have been repaired, according to OPM spokesman Bob Chlebowski.

IBM engineering changes have eliminated the problem, Chlebowski said. Users of 3031s did not experience the problem because the concept of channel directors for that model was different, he added.

One of OPM's biggest clients, McDonnel Douglas Corp., will soon have a total of nine 3033s and two 3032s. It suffered director problems on its first 3033 deliveries, which were cleared up, and encountered no problems on subsequent deliveries.

Three Blue Cross/Blue Shield DP centers had director problems on their 3032s, including Blue Cross Hospital Services in St. Louis [CW, Jan. 15, 1978]. IBM was candid in discussing the difficulties with the director, Chlebowski said, and made every effort to keep user difficulties with the machines to a minimum.

James Walsh, vice-president of management information systems at CBS Broadcasting in New York, found a "night and day difference" between 3032 machines delivered before and after November. One machine, installed last June, displayed director problems; a second 3032, delivered in December, has performed impressively, Walsh indicated. CBS is now working to get the two machines to perform "equally," he said.

General Dynamics Corp. acquired its first 3033 last July and was able to clear up director problems before its second 3033 arrived in November. The second machine turned out to be free of any problems, according to spokesman L.E. Shea.

First Oklahoma Bancorp of Oklahoma City reported that its 3033, delivered in August, had director problems for about 60 days, but they were cleared up by an engineering change. Since then, only "minor outages" not associated with directors occurred, according to Charles Nelson, first vice-president of data management at First Oklahoma Bancorp.

At Western Geophysical Co. of America, a division of Litton Industries, a 3033 installed in July has been free of director problems — and most other problems as well. "In all," vice-president of Data DP James Hornsby said, "the CPU has been a pretty good experience for us."

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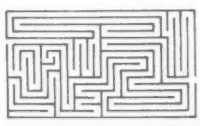

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DPers Free From Public Scrutiny

Computer Power Seen Route to Political Clout

By Brad Schultz
CW Staff

IRVINE, Calif. — When a city automates, it concentrates political power in the people who use computer systems, in those who control that usage and in nonusers who understand the technology.

So stated a report on the impact of DP management policies in local government issued by the Public Policy Research Organization's (PPRO) Urban Information Systems (Urbis) Research Group.

After investigating DP's impact on 42 U.S. cities, Urbis found that city officials had expected computing to result in improved efficiency, lower costs and better service to citizens [CW, Jan. 29]. The officials expected these benefits — or any unforeseen negative results — to be evenly distributed through their governments.

In most of these governments, however, automation has raised costs, increased workloads and time pressures, reduced responsiveness to the public and disrupted power balances. While DP has made life harder for nearly everyone in municipal agencies, it has been especially rough on the lower ranks because those personnel tend to be in direct, daily contact with computer systems, the report said.

No Review of DPers

City officials typically avoid responsibility for managing systems and prefer to delegate control of usage to technically oriented subordinates, the report pointed out. These city DP managers are usually free from close public scrutiny, whereas officials endure review by city councils, citizens groups and the press.

The delegation of control therefore reduces pressure from outside the municipal government to hold city computing accountable to the public, the report concluded.

For mid-level city staffers, computing poses such problems as lack of data needed for analysis, slow response to information requests, foulups in daily operations, difficulty in obtaining priority for computer use and frequent technical and organizational changes in computer services, Urbis said.

Top city administrators often find that the wrong sort of data is computerized and that data deserving computerization is still manually processed, the report continued. In addition, the computerized data tends to be formatted to fit just some of the users it might benefit.

Such "informational problems" prevent city officials from obtaining the data they need in time for it to be useful. Urbis termed this situation serious because the cities had expected automation to provide much faster and easier access.

'Reform Approach'

Municipal DP may be disappointing because most cities implement computer systems with a stress on economy and efficiency, but without careful consideration of organizational and psychological effects, the report said. This "reform approach" to implementation comes from the city reform movement of 50 years ago that focused on structural change and assumed that, because many workers disliked their jobs, they must be closely supervised.

In contrast, the "post-reform" approach to implementation, which is derived from the labor union movements following World War II, emphasizes the needs of both the public and city employees. "According to the postreformers, technology must be

(Continued on Page 10)

Local Government DP: A Report

How does computing affect municipal power relationships? Does it benefit some cities more than others? What philosophy underlies the prevailing attitudes toward system implementation?

This installment of *Computerworld's* series on local government DP, which continues on pages 10 and 11, is based on a report by the Public Policy Research Organization's (PPRO) Urban Information Systems (Urbis) Research Group.

The Urbis report, entitled "The Management of Information Systems: Implementation Policy for Computing in American Local Government," presents the conclusions of a two-year research effort that entailed on-site investigations in 42 U.S. cities with populations ranging from about 50,000 to nearly 2 million.

Those wishing to obtain copies of the report can contact Kenneth L. Kraemer, PPRO, University of California, Irvine, Calif. 92717.

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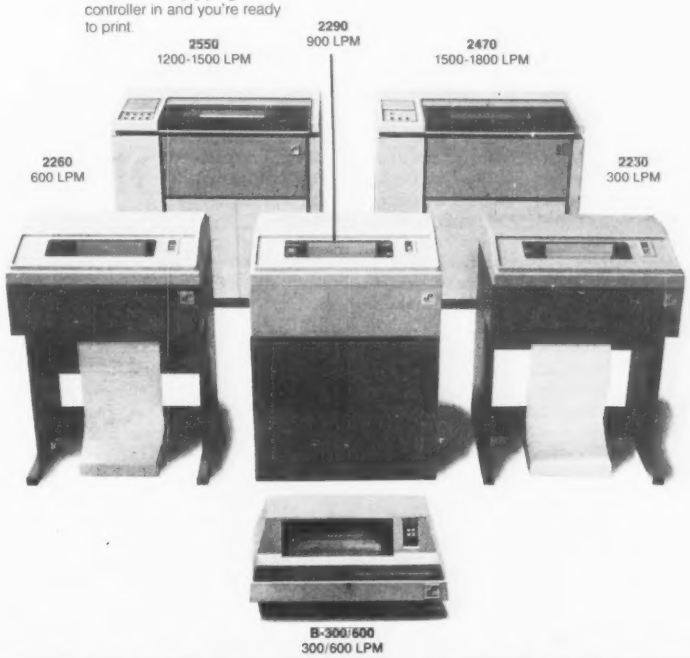

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Urbis Finds Police Solidly Behind Automation

By Brad Schultz
CW Staff

IRVINE, Calif. — Automation allows city police to make more arrests and complete more criminal cases. While patrol officers favor the introduction of computing more than detectives, police departments solidly endorse the trend and have computerized more than other departments in most U.S. cities.

Those conclusions come from a study of computing in local government conducted by the Public Policy Research Organization's Urban Information Systems (Urbis) Research Group. To learn how municipal police feel about DP, Urbis interviewed police officials as well as detectives and patrolmen in representative U.S. cities.

The group also examined performance records and the installations themselves to learn how implementation strategies have affected police productivity.

Local vs. Remote Power

Computer-supported detectives can investigate a larger number of cases when the CPU is located in their department, Urbis found. When detectives must tie into a remote CPU — for example, to access the National Crime Information Center (NCIC) in Washington, D.C. — they are less likely to use computer files and they complete a smaller number of cases.

Time savings — the most frequently reported benefit of computing — was reported more frequently by detectives with local CPUs (86%) than by detectives forced to use remote systems (80%). Another benefit, increased leads and workable cases, was mentioned more often by detectives with locally processing power (68%) than by those bound to remote CPUs (58%).

However, some benefits are more common among telecommunications users. Reduced paperwork, for example, was experienced by 32% of detectives with local systems compared with 42% of their remotely processed peers.

Urbis found technical problems such as equipment downtime to be the most widespread grievance among comptuer-assisted detectives, more so among those with local CPUs. About two-thirds of detectives with local automation complained about inaccurate or hard-to-read computer-generated data, compared with just one-third of remotely-supported detectives.

Two Points of View

Both detectives and patrol officers in 90% of the cities Urbis examined said computing has either decreased or not affected their job pressures. In nearly every city, both types of police reported that computing has raised or not affected their sense of accomplishment and has not affected their opportunities to work with people.

Computing seems to have made no decisive impact on the extent to which detectives are supervised or the extent to which they influence other people, Urbis continued. But many patrol officers find that automation has made them more closely supervised and more influential.

All of the Urbis cities have computer-assisted police departments or detective units. All departments have some level of access to local, state and national automated crime data banks and nearly all are tied to NCIC's "wants and warrants" files.

More than 90% of the departments have access to automated records on the registered owners of motor vehicles and records of stolen motor vehicles.

Automated criminal history files are available to 68% of the Urbis cities. These files, usually on-line, are one of the most important automated data sources in detective work, Urbis said.

Support for Detectives

Detectives tend to use automated files in most of their cases, Urbis observed. Less than one-fifth of the detectives surveyed termed police computing inappropriate or a waste of time.

Most detectives believe computing allows them to work adequately on more cases than they otherwise could handle. According to Urbis, detectives that did not report this benefit often claimed nevertheless that computing allows them more time for other activities, such as field interviewing.

Detectives must spend a lot of time retrieving filed information, completing forms and writing reports, Urbis noted. Computing facilitates these functions.

A detective is usually assigned to a case after a patrol officer dispatched to the scene of the crime files a report. The detective begins his investigation by determining the identity and criminal histories of all those listed on the report as suspects, victims and witnesses, Urbis explained.

The detective makes a background check on each suspect by searching wants and warrants, criminal histories and alias name files. With other information from the report or from interviews, the detective may also search through patrol officer's field interrogation reports on suspicious persons interviewed near the scene of the crime and close to the time it occurred.

The detective might also search through records for a pattern of the modus operandi. For example, records of all deaths in which the victim was strangled with wire would be sought.

If motor vehicle license numbers were taken, license files might be searched; the same procedure would be followed for firearms if a weapon was recovered. Other searches might involve fingerprint files, photograph location files, records of property sold to pawn shops, files of known members of organized crime and records on the physical descriptions of known offenders.

Data Corroborates Evidence

Once a suspect is in custody, these files can be used to corroborate or refute his statements to the police, Urbis explained. For example, the detective may discover that the suspect received a traffic ticket near the scene of the crime about the time of the crime was committed, while the suspect claimed that he was far from the vicinity at that time.

Complicating Factor

Detective data searches are complicated by the fact they typically involve information stored by law enforcement agencies of various jurisdictions — city, county, state, federal — and in various locations, Urbis continued. Sometimes the interests of different specialized units, such as narcotics and homicide squads, intersect and data must be shared.

"As a consequence, detectives either constrain their search activity, spend all their time [searching] or integrate the information of the multiple police jurisdictions in such a way that it can be easily and rapidly retrieved," Urbis said.

RESPONDENTS' PERCEPTIONS OF COMPUTER IMPACTS AND VIEWS TOWARD DATA PROCESSING BY ROLE*

Computer Impacts*	Detective Units		Patrol Units	
	Percent Agreeing	Average Score	Percent Agreeing	Average Score
Computer makes new information available	66%	57	78%	58
Computer provides more up-to-date information than manual files	73	62	90	66
Computers make it easier to get information	88	70	100	73
Computers save time in looking for information	83	67	92	69
Computer increases the amount of information I must review and analyze	17	39	10	39
Automated information is difficult to change or correct	10	35	8	36
Computer data is less accurate manual records	2	24	0	22
It takes too long to get the computerized information I need	7	26	2	24

* Percentage of cities in which the average score for detectives suggested agreement with the statement. Agreement equaled an average score greater than 50 on a scale ranging from (0) disagree, (33) somewhat disagree, (67) somewhat agree and (100) agree.

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DP Seen Route to Power

(Continued from Page 9)

consistent with and not harmful to the interests of those who manage and use it," Urbis explained.

Advocated by an older generation of management scientists, the reform approach recommends that city DP managers:

- Automate DP tasks to the greatest extent possible.
- Adopt computing as early as possible.
- Use sophisticated, modern computer systems.
- Use the existing capabilities of on-line, real-time processing and data base management.
- Hire sophisticated computer experts.

The rising generation of management scientists is inclined to advocate the post-reform approach, according to Urbis. This approach recommends that the users:

- Not automate any task that can be satisfactorily handled using manual operations.
- Automate only those parts of an information processing task that pose a problem to the manual operation.
- Move slowly in automating, responding to actual rather than anticipated needs.
- Adopt computer systems just sophisticated enough to do the job, no more.
- Hesitate to use on-line, real-time processing and data base management capabilities.
- Gear the technology to the caliber of available personnel.

The prevailing reform approach to implementation leads policymakers to centralize the control of DP operations, the report said. This approach also leads officials to minimize the number of users involved in DP decisionmaking.

The post-reform approach prompts decentralization of computing operations and maximizes the involvement of users in DP decisionmaking.

Urbis Ties Environment, Performance

Detectives Get Most From Local Computing

By Brad Schultz
CW Staff

IRVINE, Calif. — City detective units benefit most from computing if the CPU is local, systems reduce job pressures, users are involved in applications design and partisan politics scarcely interferes with police policy.

This relationship between DP environment and detective performance is just now coming to light, according to the Urban Information Systems (Urbis) Research Group study of computing in local government.

Systems allow detectives to make more arrests and complete more cases than they otherwise could, Urbis said. In fact, police applications comprise one of the few main categories of city DP that successfully meet most expectations of city officials.

Detectives with access to a departmental computer system can handle more cases in a time frame and solve a greater proportion of the rapes and burglaries assigned to them than detectives who depend on remote CPUs for retrieval of computerized data, Urbis found.

Detectives supported by local CPUs recover a greater proportion of the property reported stolen in their jurisdiction and, over the long haul, complete a greater proportion of the cases they initiate.

This is a significant difference, Urbis pointed out, because locally processed police departments grapple with a far higher per capita incidence of nearly every category of major crime than do remote user police; but they field about the same number of personnel per thousand crimes reported. Hence, they do more with less.

Design of Applications

Most detective units whose performance has improved as a result of computing also report that systems have reduced job pressures. "Some cities have not designed applications in ways which clearly enhance the work environment of detectives," Urbis said. "Apparently, such insensitivity to the work environment translates into lessened performance for detectives."

Detectives benefit more from computing applications they have helped to design than those designed exclusively by outside specialists, Urbis indicated. However, computer support is more effective if outsiders operate the systems and devices rather than police personnel.

Top city officials and their staffs generally play no role in designing police DP applications, Urbis said. About half of police chiefs, commissioners and top police managers do, however, consult in this process. About three-fourths of police captains and lieutenants and more than half of detectives either consult or belong to applications design teams.

'Detectives benefit more from computing applications they have helped to design than those designed exclusively by outside specialists.'

Computing is less helpful to detectives if police departments must allow for the influence of partisan politics, Urbis continued. Although partisan politics seems to make computing *more* effective for other municipal departments by exerting pressure when systems-supported sections fail to meet public demands, police work best in an atmosphere that rewards adherence to professional values. Moreover, police are reportedly intolerant of coercion from city hall.

In most of the cities Urbis examined, detective units find it difficult to accept computer systems as routine because the nature of systems has been rapidly changing. In 1978, 18% of the cities changed the generation of their police CPU; 29% changed priorities of applications in development and 11% changed the level of programming language used by police. Nearly half the cities have gone through two or more revisions of most police applications; 14% have revised nearly all of these tasks at least twice.

DP Support for Detectives

Urbis made the following recommendations on how to implement DP support for detectives:

- Cities should automate early and rapidly to avoid "routinization" problems.
- Cities should provide a local CPU, avoiding dependence on remote facilities.
- Cities should automate as many of the records used by police as possible.
- The police should have on-line inquiry capabilities to enhance speed of access to information.
- Control of police systems should not be concentrated in elected political officials nor subjected to excessive partisan influences.

Software Packages

Police departments began to develop their own DP applications in the 1950s, starting with crime reporting tasks, Urbis said. The volume of in-house development peaked toward the end of the Vietnam War era. Since the early 1970s, city police have employed software packages developed under subsidies from the federal Law Enforcement Assistance Administration.

In the mid-1970s, about 80% of U.S. cities with populations exceeding 50,000 had automated police functions — typically, about seven separate applications.

Many police software packages are not flexible enough to allow for individual city differences, Urbis declared. Most of the Urbis cities indicated that use of packaged programs was either "unworkable" or required significant modifications. Some cities tried a package, found it inadequate and decided never to use any package again.

According to Urbis, computing seems to benefit patrol officers more than detectives largely because patrol information searches are more routine and structured than detective searches. Urbis termed computer applications designed to support patrolmen a "subset" of applications that assist detectives.

Urbis made the following recommendations on how to implement DP support for patrol manpower allocation:

- Police users should be involved in the design of manpower allocation programs.
- Elected officials should not control the automation of manpower allocation.
- Police should not be charged for computer usage, since that would limit the autonomy of allocation analysts.

Police should not automate patrol manpower allocation too rapidly or extensively, Urbis warned. This might result in "higher levels of dissatisfaction on the part of district commanders and much more dependence on police computer specialists, rather than on police officers trained to read statistical reports."

City administrators should realize that massive, fast-developing automation projects tend to concentrate control of systems vital to the police in the hands of technical specialists who usually lack great insight into police needs, Urbis maintained.

Although police tend to appreciate the value of human relations in their work, DP managers may place too much emphasis on efficiency for its own sake.

LIKES MENTIONED BY COMPUTING USERS IN DETECTIVE UNITS

Likes*	Percent of All Cities (N = 40)	Locally Unautomated (N = 12)	Locally Automated (N = 28)
Saves time in investigation	85%	80%	86%
Increases leads and workable cases	65	58	68
Reduces paperwork	35	42	32
Speeds arrest	35	33	36
Clears more cases	20	8	25
Enjoyable, interesting activity	12	0	18
Improves quality of court cases	10	17	7
Helps work in custodies	8	0	11
Improves office environment: saves space, looks nice, quiet	8	0	11

* Mentioned or emphasized

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DISLIKES MENTIONED BY COMPUTING USERS IN DETECTIVE UNITS

Dislikes	Percent of All Cities (N = 40)	Locally Unautomated (N = 12)	Locally Automated (N = 28)
Technical problems (down, overloaded, broken hardware)	90%	83%	93%
Information not accurate, incomplete, hard to read, inaccurate entry loses information	55	33	64
Lack of flexibility in use	30	—	—
Detectives don't know how to use	28	0	39
Waste of time, less successful than other activities, not the way to do detective work	18	17	18
Difficult to use, complicated to query	15	0	21
Runs cost too much, DP expensive, money should go elsewhere	2	0	4

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Correction

Last week's chart on Page 5 entitled "IBM Technology Insertion Strategy" indicated the 3370 disk drive introduced with the 4300 series equipment would give users 16,268 bytes per dollar spent. That number should have been 21,690 as the text stated.

Buck Rogers to Triumph Again

By Tim Scannell
CW Staff

SAN DIEGO — Thanks to a handful of Hollywood movie technicians and a computerized pilot training system here, Buck Rogers once again will triumph over the forces of evil that lurk in the 25th century.

Scheduled for release as a feature film next spring, Universal Studios' production of the comic strip hero's adventures will include a variety of mid-air dogfight scenes, Buck Rogers' Thunder fighter will be pitted against archenemy Killer Kane's deadly Hatchet spaceships.

To make the scenes as realistic as possible, Universal used Cubic Corp.'s Air Combat Maneuvering Range (ACMR) pilot training system to simulate the aerial battles.

The specialized movie combat system — an extremely simplified version of the ACMR computer employed at U.S. and foreign air force and navy bases around the world — consisted of a four-foot color screen linked to an Adage, Inc. graphics display terminal, according to Sid Longerbeam, Cubic's project coordinator.

The rotating movements of the studio-drawn spacecraft across the screen were directed by manually adjusting a series of variable control dials, causing the science-fiction fighters to dart and angle in various war-like patterns.

'Rare Type of Filming'

"The type of filming we did at Cubic is rare," Universal associate producer David Phinney explained. "Because it is a 'one-shot,' we had to shoot the fighters and the four-foot color screen from every conceivable angle.

"In one scene, we shot a spacecraft fighter entering from the upper left corner and proceeding to the lower right corner. Then we shot the reverse, the ship entering from the upper right and continuing to the lower left.

"We did this because we never know exactly what shots will be needed when the film is edited," he explained. "The direction of the actual battle can be varied considerably."

Although Cubic's Longerbeam said the fighter software was fairly simple to design, the final spaceship figures appear to be quite sophisticated because of the stroker-type — or point-to-point — graphics equipment that was used.

"The one nice thing about stroker is that because it is point-to-point, we're not bothered with refresh rate as far as blank or unblank lines," Longerbeam stated. "We can draw a diagonal vector and it looks like a diagonal vector. If you did that on raster (a series of scanning lines) and if you don't have the resolution, then it looks like a staircase."

Only One Problem

The only problem the movie crew encountered was matching the frame rate of the stroker picture on the four-foot screen with the speed of the camera to keep up with the changing positions of the aircraft as they darted in and out of the scene, Longerbeam said. A special video camera was developed by Universal to synchronize the on-screen activities and eliminate any "flicker" that might occur.

In the final film version, a variety of special effects and small-scale models will be used to highlight the celluloid battle scenes and facilitate close-ups.

In contrast with the Hollywood-oriented battle system, Cubic's actual ACMR equipment can duplicate dogfights with up to eight aircraft at the same time; it has a range of 5,000 feet to 50,000 feet and 30 miles. The system is, in fact, a series of subsystems interactively linked to a display screen on the ground.

Fighter aircraft are equipped with communications pods, attached to either wing, which transmit reference and weapons data back to several land- and sea-based radar stations. The stations relay information back to a four-CPU Interdata, Inc. system that accurately portrays the airborne action on the color screen.

"Everything is displayed in real-time on several CRTs and the large screen display, and it also is recorded on tape for later playback," Longerbeam said.

In addition, the computer keeps track of the pilot's air speed, angle of attack, altitude and "G," or gravity forces. "We can record more data than [the pilots] can even see from their instrumentation onboard the aircraft," Longerbeam noted.

Burroughs Users Offered Meets

ROMULUS, Mich. — Data Management System II (DMS-II), a software package for Burroughs Corp. B6000 and B7000 mainframes, will be analyzed in two seminar workshops in the Detroit area this spring. The seminars will be sponsored by MIS International, Inc.

The "DMS-II Data Base Development and Programming Seminar" Feb. 26-March 2 will examine the function and syntax of the software's data and structure definition language as well as its Cobol and Algol extensions.

The "DMS-II Data Base Design Workshop" is set for March 5-8.

Registration fees for the two workshops are $625 and $525, respectively, including instruction manuals, course materials and lunches. MIS International is at 31350 Smith Road, Romulus, Mich. 48174.

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Faced With Sluggish Economy

'Leveraged Leases' Called Best Bet for User

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — If the U.S. economy proves as sluggish in 1979 as many economists fear, users might find "leveraged leasing" their only realistic means of financing upcoming hardware purchases.

Leveraged leases usually offer lower lease rates than nonleveraged varieties, according to Michael W. Berwind, a member of the San Francisco-based law firm Graham and James. As a result, users with cash flow problems stand to gain more from leveraged leasing than any other group, and in economically uncertain times such users need every available financial break if they want to avoid a cutback in hardware acquisitions.

Leveraged leases differ from more familiar types of leases primarily in the number of business partners they involve, Berwind explained at the Computer Law Association's (CLA) most recent meeting here.

A conventional lease usually entails just two parties: a lessor and a lessee. The lessor shoulders 100% of the cost of buying a system and then permits a user to borrow the system in return for a monthly fee.

A leveraged lease, by contrast, typically involves a third party — a lender, which can be a bank, an insurance company, a trust, a pension fund custodian or a foundation. In a typical leveraged lease, the lessor contributes only 20% to 40% of the capital needed to acquire a computer system. The remaining 60% to 80% comes from the lender, which provides money to the lessor on a nonrecourse basis, Berwind explained.

CW At CLA

For the lessor, the arrangement has obvious advantages because, although it pays only a relatively small percentage of a sytem's total price, the lessor can claim a depreciation and an investment tax credit based on the equipment's full value, Berwind said. The resulting financial "leverage" permits the lessor to finance an expensive computer system at lower lease rates than would otherwise be possible.

For the lender, a leveraged lease also has advantages because it ensures a well-collateralized loan and contains provisions that hold a user to a long-term lease "come hell or high water," Berwind said. Because of the number of parties involved and the high cost of paying lawyers to make the necessary arrangements, "leveraged leases are normally reserved for computers and other equipment that cost more than $1 million," he added.

Despite all their potential benefits, however, leveraged leases also pose grave risks for unwary lessees. For this reason, users should act carefully and consider all the possible pitfalls when contemplating this form of financing, Berwind cautioned.

Perhaps the most serious danger associated with leveraged leasing is a "special tax indemnity," which protects a lessor from the penalties of unexpected tax law changes. Lessors base their assumptions for calculating leveraged lease rates almost entirely on existing tax laws. Thus, if tax laws change, as they frequently do, the lease rate for a leveraged lease also changes.

If it agrees to a special tax indemnity, however, a user is obligated to compensate a lessor for any losses it sustains from tax law changes. Special tax indemnities, therefore, clearly favor lessors, and any lessee that agrees to such conditions without fully understanding their implications could pay a heavy price later if tax laws unexpectedly shift.

"Leveraged leases are extremely sensitive to modifications in tax legislation," Berwind explained. "So a user considering a leveraged lease should first ask a lessor, 'How will my lease rate change if the tax laws change?' "

Users should also beware of general tax indemnities, which make them responsible for paying sales, property and use taxes for their leased equipment, Berwind added.

A third pitfall users should bear in mind when considering a leveraged lease is a "general indemnity," which makes lessees financially liable for any hardware problems that arise during the life of their contracts.

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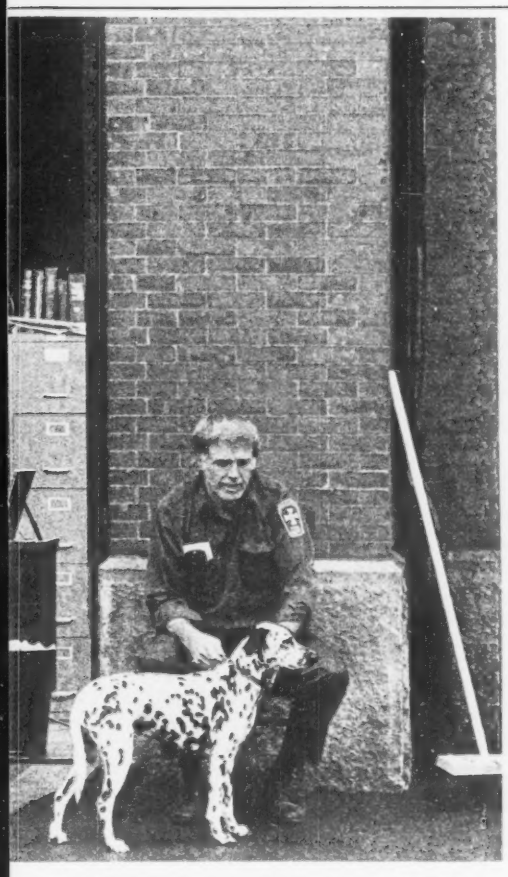

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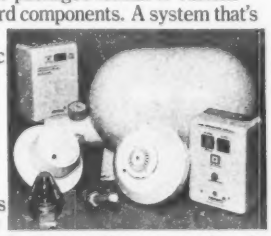

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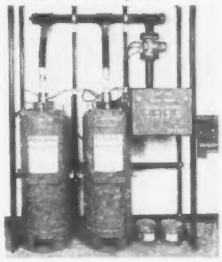

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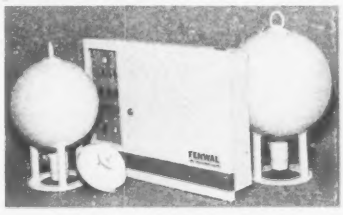

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Hurd Testimony Paints Picture of Early IBM

By Connie Winkler
CW Staff

"I recall one meeting in [Thomas J.] Watson Sr.'s conference room in the early 1950s attended by him, his son, [A.L.] Williams, [James] Birkenstock, [Wallace] McDowell, [T.V.] Learson and me at which Mr. Watson Sr. displayed a chart indicating that the company had suffered a dip in its profits.

"As he displayed the chart, he said, 'You fellows get your heads together because you are spending too much money and we can't afford it and we've got to get the profits up.'

"We went back to our offices and he sent us each a picture of horses being attacked by wolves. The horses were getting their heads together and kicking the wolves, and there was a note attached to the picture which said, 'Now I want you fellows to get your heads together. . . '"

NEW YORK — That story of IBM's early days was told by Dr. Cuthbert C. Hurd at the U.S. vs. IBM antitrust trial here last week. Hurd, who got one of those pictures, was very much a part of the development of seven of IBM's first computers.

Hurd left IBM in 1962 and has been a computer consultant since. In his five weeks on the stand talking history and bolstering IBM's defense, he contended all computers are general-purpose computers — in other words, there is no difference between what's commonly called a commercial machine and what's known as a scientific computer.

Hurd said he came to this conclusion about mid-1953 after visiting many IBM customers who were using the IBM 701 to run both scientific and commercial applications.

Mathematician Hurd, one of the first three Ph.D.s hired by IBM, defended his general-purpose machine argument one day at the trial when he spent an hour, marker in hand, explaining Sir Isaac Newton's three laws of motion. Such calculations would be used in launching a rocket, and Hurd's point was that the calculations boiled down to a series of addition and multiplication operations that could be run on any computer.

Lack of Distinction

The government, however, attacked Hurd's lack of distinction between commercial and scientific machines and/or applications. Justice Department lawyer Bernard H. Meyers pointed to two times in which Hurd had distinguished between scientific and commercial computers: in 1973 in his testimony in the Telex vs. IBM lawsuit in Tulsa, Okla., and in 1972, in remarks to the Smithsonian Institution "Oral History of Computers" project.

In testimony at the Telex trial about the first generation of computers, Hurd called the 701 a "scientist's machine" and the 702 a "commercial or businessman's" version of the 701. After persistent questioning by both Judge David N. Edelstein and Meyers on whether the statements made at the Telex trial are true today, Hurd said yes.

He added, however, "I would not give an answer now without describing the context in which that was said."

Also reluctantly, Hurd said he must have been describing his beliefs before 1953 in his statements to the Smithsonian project.

Attempt to Show Bias

During most of the cross-examination, the government attempted to impeach Hurd's testimony by presenting contrary documents. Meyers opened his examination by pointing out that:

- In 1972 Hurd was hired by Cravath, Swaine & Moore, IBM's attorneys, to educate the law firm's associates about computers and to keep it abreast of trends in the computer industry.
- Hurd testified for IBM in the Telex and Greyhound cases.
- Since 1974, when Hurd started his own computer consulting business, he has been paid $300,000 by Cravath, Swaine & Moore for services that do not include his testimony in U.S. vs. IBM. As in all his consultations, Hurd is billing Cravath $1,500 a day plus expenses.
- Hurd introduced Cravath lawyers to other computer experts, some of whom became witnesses for IBM.
- He and Dr. H. Dean Brown, who testified for IBM in December, are partners in a new firm named Picodyne.

'Defense Calculator'

As with the past nine witnesses, Hurd's direct testimony was mainly presented in an 111-page narrative, the longest so far. That was supplemented with two and one-half days of live testimony.

The narrative reads like a history of the early computer industry from IBM's perspective. Hurd said he was the person who urged Thomas J. Watson Jr. to go ahead with IBM's first electronic general-purpose computer, which at that time was called the "Defense Calculator" and later the IBM 701.

The development of the Defense Calculator was in response to the senior Watson's promise to President Harry Truman to help the Korean War effort. Such a machine was needed by government agencies at that time, Hurd believed, and he worked hard to sell the machine both internally at IBM and to those government customers (see story on Page 15).

The switch from primarily mechanical to electronic computers was hotly contested within IBM, Hurd recalled. He believes the internal argument wasn't settled until 1956 and the introduction of the Stretch machine.

Hurd said the biggest risk IBM took during this time frame was when it assembled the people, parts and know-how to produce 19 of the 701's when it only had firm orders for five. IBM's defense in this trial is that this is precisely the risk-taking which made the company the success it is today.

IBM Response Brief

IBM's response to the government's 10 days of cross-examination of Hurd was surprisingly brief. IBM counsel Joseph R. Sahid spent about 90 minutes of redirect examination, during which Hurd reiterated that it was IBM designers and engineers who actually built the magnetic core memories in the 704.

The government previously introduced documents showing that RCA, with its Bizmac machine for the Army in 1956, was the first to deliver a machine with magnetic core memories. The government suggested it was only after IBM paid another firm — International Telemeter Co. — $100,000 to develop core memories inexpensively for the 704 that IBM engineers got around to doing it.

Throughout Hurd's testimony and in that of the past several IBM historical witnesses, the government has tried to show that IBM itself did very little that was technologically innovative. IBM piggybacked its new computers on what other companies and universities introduced to the budding computer industry, the government maintained.

IBM apparently believes that the government cross-examination missed the whole point of Hurd's direct testimony — Hurd's list of IBM innovations for the electronic, digital computer and the need for bundling hardware and services for early, inexperienced computer users.

IBM considers Hurd a highly regarded computer expert and thinks it right he be paid for his services during this litigation. One trial observer noted that the government did little actual questioning of what Hurd said in his narrative, but concentrated on peripheral issues. These are common lawyer's tactics when the opposition doesn't have a case, the observer suggested.

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Fire Hits Amdahl

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Users of Amdahl Corp. hardware are expected to feel few if any ill effects from a fire that caused an estimated $100,000 damage to one of the buildings at the company's world headquarters here.

Amdahl's production facilities and delivery schedules were reportedly unaffected by the blaze, which occurred in an engineering area housing development labs, test equipment and office space.

The fire never posed a serious threat to the company's manufacturing operations, which are housed in a building apart from the engineering area, according to an Amdahl spokesman.

The blaze apparently started in a hollow space between the engineering building's roof and false ceiling and did most of its damage to nearby air conditioning ducts. Destruction was minimized by the building's sprinkler system, which was activated shortly after the fire began.

"The fire caused a mess, but no serious problems," the spokesman said.

Sunnyvale's public safety department is investigating the cause of the blaze.

Rental Jumped From $8,000 to $22,000

IBMer Says 701 Not Underpriced Deliberately

By Connie Winkler
CW Staff

NEW YORK — Did IBM know the 701 was underpriced but not tell customers so they would not consider competitors' computers?

Testimony at the U.S. vs. IBM antitrust trial last week indicated the company originally told customers the 701 would cost $8,000 per month; when the machine was delivered, however, it carried a monthly rental tag of $22,000.

According to Dr. Cuthbert C. Hurd, IBM did not underprice the machine. What happened in 1951 with the announcement of IBM's first electronic, digital, stored-program computer seems moot today, but it has been a key question during Hurd's five weeks on the stand here.

During the trial, Hurd was described as the man who single-handedly sold the 701 not only to doubting IBM management, but to more than 30 customers. The 701, initially called the "Defense Calculator", is considered IBM's first electronic DP machine.

Hurd testified during his 10 days of cross-examination that when he traveled around the country selling the Defense Calculator in the first months of 1951, he quoted a price of $8,000 per month rental for that machine. He got about 33 letters of intent for the machine, but he did not consider them firm orders, he said in court.

Price Compromise

In March or April 1952, the final engineering model of the 701 was completed; at that time IBM learned it would perform twice what was expected and that a more appropriate price would be about $22,000 a month, Hurd said. Hurd negotiated this price down with the IBM Accounting Department.

"I took the position . . . the customers had made their plans based on the $8,000 a month and it was unreasonable to go from a price of $8,000 a month to $20,000 a month. And we compromised on $15,000," Hurd said. IBM customers were unhappy with the price increase — in particular a Mr. Stevenson at the Douglas Aircraft Company.

Issue of Time

Attorney Bernard H. Meyers of the Justice Department's San Francisco Antitrust Office, who conducted Hurd's cross-examination, introduced the transcript of a 1972 Share meeting of computer pioneers. During that informal session, a user at the Rand Corp. said Rand gave up developing its own computer, the Johnniac, because the 701 was originally presented as such a bargain.

Responding to that transcript, Hurd said he was uncomfortable at that session and left early because of the drinking and language.

Issue of Number

A memo dated April 25, 1951 from an official at Griffiss Air Force Base in Rome, NY, to an IBMer revealed he was aware IBM would be producing only 20 of the 701s. The date on the memo is important because Hurd testified the decision to manufacture only 18 or 19 Defense Calculators was not made until 1952. Hurd said he did not know the persons named in this memo nor did he recall meeting with anyone from Griffiss in 1951.

Although 33 letters of intent for the 701 had been received by the summer of 1952, Hurd contended there were only five firm orders for the machine. Based on "optimism" at this point, Hurd said he guessed at the number of 701s IBM should actually manufacture and came up with 18 for external customers and one for IBM use.

Hurd acknowledged that IBM did not intend to manufacture any more 701s after the 18 orders were filled and that the company wanted to move on to the 704. The Share meeting transcript suggests, however, that IBM could have sold 25 of the machines.

The transcription tells an interesting story of how Hurd went about selling the 701. Hurd first got the approval of top IBM executives including Thomas J. Watson Sr. and Thomas J. Watson Jr. in meetings during Christmas week 1950. At those meetings the price was set at $8,000 and Hurd got 30 block diagrams of what this new IBM machine would be.

The following is an excerpt from the tape of the Share meeting:

Hurd: "We got the $8,000 price, and then we got 30 copies of this photostat . . . of this one-page block diagram. All we had on it was 'IBM Defense Calculator.' I said to myself, 'I better get out of town before this meeting can change.' So I was out of town before morning. I guess the rest is pretty well known."

Share pioneer: "Cuthbert Hurd in one sales swing around the country got 30 orders for the Defense Calculator."

Hurd: "I think [IBM Executive Vice-President James] Birkenstock got three."

Share pioneer: "Probably a more important point is that he first of all sold it internally, and that was hard . . . And then he escaped from the meeting in time, and if he hadn't done it, there wouldn't have been a 701."

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Banks Getting Ready for Financial Privacy Act

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Congress is considering a proposal to forestall the deluge of paper that will descend on the American public next month when portions of the Right to Financial Privacy Act of 1978 go into effect.

The privacy law, which basically says government agencies can obtain personal financial information only after taking specific legal steps, contains a provision under which banks must send all their customers a statement of their rights under the act [CW, Oct. 23].

The Federal Reserve Board last week issued a proposed model statement of customer rights that banks can send to their customers, thereby fulfilling the notification requirement.

At the same time, the "Fed" noted that a bill recently introduced in the Senate, if passed before March 10, would relieve banks of the requirement.

The proposed statement would implement the notification section of the law, which becomes effective next month and which "directs the board to prepare a model statement of financial privacy rights for the use of banks, credit unions, credit card issuers, thrift institutions and other financial institutions," the Fed said.

Use of the model statement would constitute compliance with the law's notification requirement, according to the Fed, whose Consumer Advisory Council last month recommended an amendment to the act that would require financial institutions to send the statement to a customer only when his records are sought by a government agency.

Bill Introduced

On Jan. 16, Sen. William Proxmire (D-Wis.) introduced S.37, a bill to make the customer statement unnecessary. However, other sections of the act would still require notification of customer rights in the event of a government attempt to acquire personal financial records, according to Anne J. Geary of the Fed's Division of Consumer Affairs.

Geary said the statement of customer rights is merely an "educational process" and strict interpretation of the law would result in some individuals receiving multiple copies of the statement, placing an administrative burden on financial institutions.

"You're going to get a notice from every bank where you have a deposit account or a loan account and from all your credit card issuers. So you're really talking about a flood of paper, and it just seems out of proportion. The benefits seem to be outweighed by the flood of paper involved," Geary said.

"There's no question it has an educational value," she added. "People probably should know about the law, but the method of delivery just doesn't seem to be very practical."

Until Congress passes the Proxmire proposal, the Fed is required to publish the proposed statement of customer rights and is asking for public comments on the statement by Feb. 16.

"The act says that all financial institutions shall notify their customers promptly of their rights under the statute," Geary said. Presumably, she added, that means the statements would have to be sent out soon after March 10, when the relevant section of the law goes into effect.

The Fed's "Proposed Statement of Customer Rights Under the Financial Privacy Act" informs customers that "federal law protects the privacy of your financial records. Before banks, savings and loan associations, credit unions, credit card issuers or other financial institutions can give financial information about you to a federal agency, certain procedures must be followed."

The statement calls for a customer to be notified of the following rights under the law:

- "You may be asked to consent to make your financial records available to the government. You may withhold consent, and your consent is not required as a condition of doing business with any financial institution."
- "Without your consent, a federal agency that wants to se your financial records may do so ordinarily only by means of lawful subpoena, summons, formal written request or search warrant for that purpose.

"Generally, the federal agency must give you advance notice explaining why the information is being sought and telling you how to object in court. The federal agency must also send you copies of, court documents to be prepared by you with instructions for filling them out."

- "In some circumstances, a federal agency may obtain financial information about you without advance notice or your consent. For example, information may be released when authorized by the Internal Revenue code, when required by law to be reported, when there has been a possible violation of federal law and when required by a federal loan program. In that case, however, you have the right to ask which agency(ies) obtained the loan information about you and when."
- "Generally, a federal agency must tell you if any records obtained from a financial institution are transferred to another federal agency."
- "If a federal agency or financial institution violates the Financial Privacy Act, you can sue for damages or to seek compliance with the law. If you win, you can be repaid for your attorney's fees and costs."

The statement must also provide the customer with a "phone number of the financial institution's office that answers customer privacy questions."

Public comments on the proposed statement should be submitted in writing by Feb. 16 to Secretary, Board of Governors, Federal Reserve System, Washington, D.C. 20551. Comments should include the docket number R-0197.

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IDC Sets Dates, Topics Of 14th Industry Briefing

WALTHAM, Mass. — International Data Corp.'s (IDC) 14th Annual Computer Industry Briefing Session is scheduled to be held Feb. 20 in Boston and Feb. 22 in Los Angeles.

The one-day seminars will analyze such subjects as "Key Trends and Product Implications," "IBM Strategy and Overall Industry Impact" and "Basic Forecasts, Market Share and Shipment/Revenue Data."

IDC staff members will offer their commentaries and insights, and attendees will have the opportunity to interact with industry planners, researchers and investment analysts, a spokesman said.

After researching user spending and conducting specific product studies, IDC determines current trends and key indicators of business opportunities, he noted.

This year the seminars will focus on the traditional areas as well as emerging sectors of the industry.

Each session costs $345 per person and $295 for each additional attendee from the same company. IDC clients and newsletter subscribers are entitled to a $50 discount.

IDC is located at 214 Third Ave., Waltham, Mass. 02254.

Lawyers Offered Answers on DP

NEW YORK — Business lawyers with questions about computers and the computer industry can now seek answers from the Computer Law Subcommittee, formed here recently by the New York Bar Association Section of Banking, Corporation & Business Law.

The subcommittee will address such issues as contracting for DP services, equipment leasing and financial structuring, computer abuse and embezzlement, tort and contractual liability, tax considerations, protection of proprietary software, electronic funds transfer, privacy issues and the use of computer printouts as business records.

Comments or items that may be of interest to the subcommittee can be sent to its chairman, Richard Raysman, at 500 Fifth Ave., New York, N.Y. 10036.

Last One Passed 74 Related Bills

New Congress Showing More DP Sensitivity

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Demonstrating an increased awareness that the U.S. has become an information society, members of Congress in 1977 and 1978 introduced 1,500 bills addressing various aspects of information policy. Of the bills, 74 became law.

But that impressive spurt of activity will probably be overshadowed by a significantly heightened sensitivity to information policy considerations on the part of the 96th Congress, now entering its fourth week.

"The gathering and distribution of information affects all our lives, yet information policy is still an unknown factor in much of the legislative process," Rep. Charles Rose (D-N.C.) said recently. "In spite of this, more and more bills are being introduced and more and more laws are being enacted which contain — in whole or in part — mandates for new computer systems or data bases, directives for collecting or disseminating information, calls for the introduction of new telecommunications systems, provision for protecting rights of privacy and other information-related matters."

Last Congress' Actions

The House Policy Group on Information and Computers, of which Rose is chairman, has delivered to Congress a compilation of those 74 bills passed during the 95th Congress. That compilation, Rose said, "dramatically illustrates the continuing impact of the new technology on the nation's laws."

While many of those new laws address rather mundane areas of information policy such as libraries, public broadcasting and the disposition of Presidential papers, the 95th Congress has also provided for U.S. participation in the International Maritime Satellite Organization (Inmarsat), approved a spate of personal privacy legislation and bought a little bit of consumer protection to the convoluted and mushrooming applications of Electronic Funds Transfer (EFT).

Laws Affecting Data Bases

The last two years also saw a number of new laws establishing various computerized data bases and other information systems for public use. Among other things, the 95th Congress mandated establishment of:

- The Federal Assistance Information Data Base, "a computerized program information system which is capable of identifying all existing federal domestic assistance programs."
- An information system to "monitor and analyze inflationary trends in individual economic sectors."
- A cooperative health statistics system, part of a program to use computer science in health services delivery and medical information systems.
- A computerized job bank.

President Carter also signed into law such disparate measures as those setting up the National Adoption Data Gathering System, the National End Stage Renal Disease Medical Information System, and the Marine Safety Information System.

While Congress and the Administration have for a number of years been setting loose on the American public an ever-increasing number of record-keeping and information gathering systems, they have recently begun to show a concomitant concern for protecting individual privacy in a society already inundated by data bases replete with personal information.

New statutes to protect the confidentiality of information contained in juvenile justice systems, safeguard information supplied to the Council on Wage and Price Stability and spell out what constitutes improper disclosure of earnings information in records maintained by the Social Security Administration and state employment security agencies were passed by the 95th Congress and signed by the President.

Other recent laws prohibit disclosures of information obtained through bank examinations by the General Accounting Office; market positions, business transactions, trade secrets and names of customers obtained by the Commodity Futures Trading Commission; and information concerning patients of community mental health centers.

Crowning Achievement

But the crowning achievement of the 95th Congress' program of privacy legislation was the Right to Financial Privacy Act, passed in an all-night session during which members of the House and Senate raced to finish their last legislative day before heading home to campaign for reelection.

That bill, signed into law Nov. 10, prohibits government authorities from obtaining copies of or accessing the financial records of any customer of a financial institution without the due legal process carefully set forth in the legislation.

The act was part of a larger banking bill that also contained the Electronic Fund Transfer Act, part of which went into effect last Thursday. The law will provide consumer protection in the use of EFT services offered by banks and other financial institutions.

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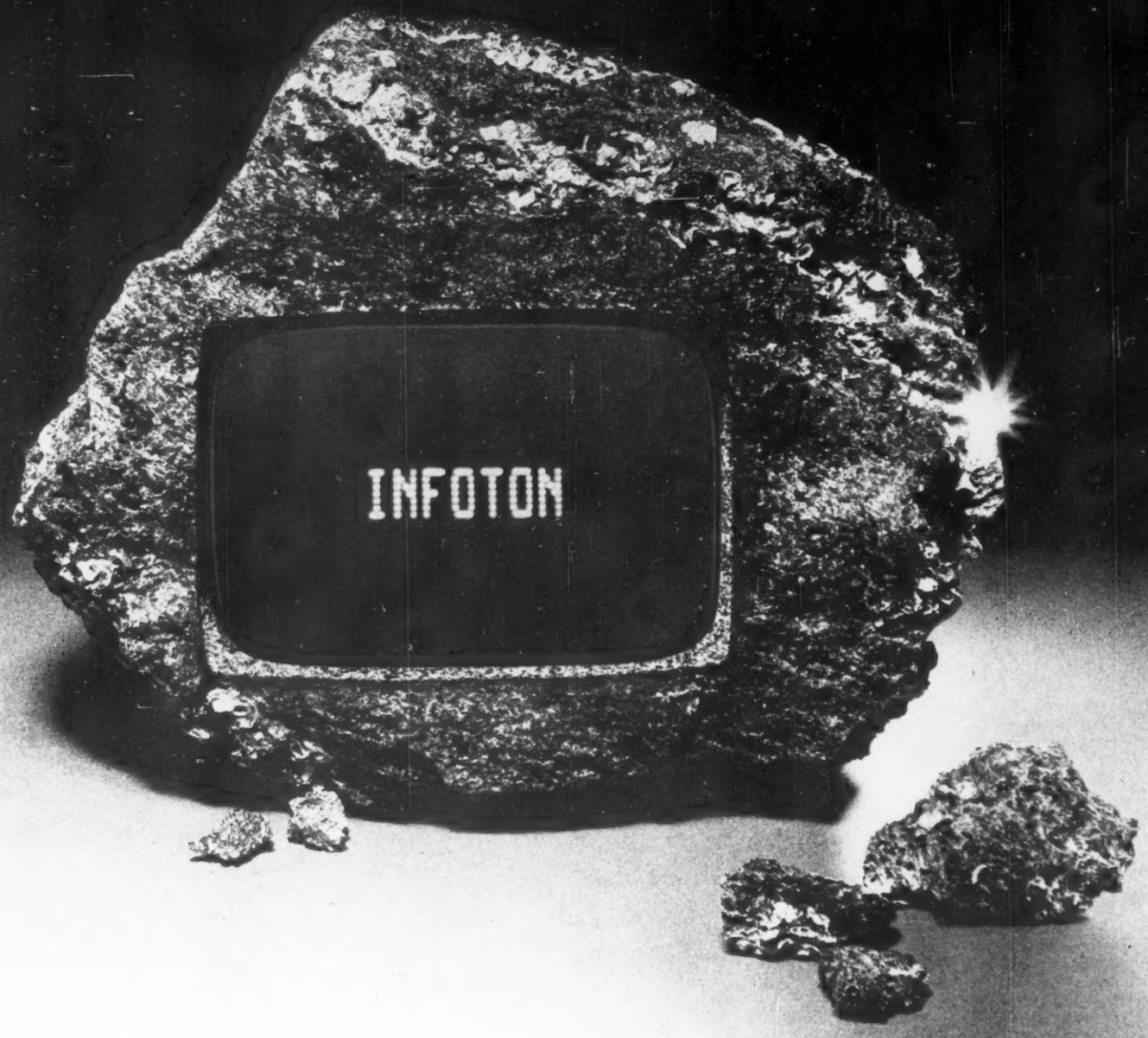

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Requires Patient's Written Consent

Rhode Island Act Ensures Patient Data Privacy

By Marguerite Zientara
CW Staff

PROVIDENCE, R.I. — Despite the ever-increasing automation of medical records information, the Rhode Island Legislature last year adopted an act limiting disclosures about an individual's health without the written consent of the patient or his authorized representative, except in specifically defined situations.

The Confidentiality of Health Care Information Act, which became effective last May, also dictates security measures to be followed by third parties receiving a patient's confidential health care information.

The security procedures include limiting authorized access to such information to persons having a "need to know" while allowing the disclosure of nonspecific information to other employees or agents.

The act also calls for assigning responsibility for maintaining security procedures for confidential health care information to a specific person or persons.

Third parties receiving such information must warn each employee or agent who handles it that the information must be kept confidential and they must explain in writing the penalties for failing to do so.

According to the act, consent forms for the release or transfer of sensitive information must contain a statement of the need for and proposed uses of the information as well as a statement of the extent to which the information will be released.

In addition, the consent form must state that the information will not be given to any person other than the one mentioned in the form and that the consent for release may be withdrawn at any future time.

Exceptions to the Rule

Exceptions to the need for written consent include the case of a medical practitioner faced with an emergency who believes "in good faith" that the information is necessary for diagnosis or treatment of the individual.

In addition, no consent for release or transfer of the information is required by a medical peer review committee or a board of medical review, but the information must remain strictly confidential."

However, the proceedings and records of medical peer review committees are not subject to legal discovery proceedings or entered into court evidence.

According to the act, health care information:

- May be given to "qualified personnel for the purpose of conducting scientific research, management audits, financial audits, program evaluations or similar studies" as long as it does not in any way identify a patient.
- May be shared among health practitioners in the same facility for coordinating health care services or for education or training and given to health insurers to adjudicate health insurance claims.
- May be given to a malpractice insurance carrier or lawyer if the health care provider anticipates a medical liability action or to a court or lawyer if liability action is actually brought against the practitioner.

In addition, a health care provider:

- May disclose specific information about a patient in accordance with law enforcement needs or "to a person if the health care provider believes that person or his family to be in danger from a patient."
- May turn in to police a patient who is attempting to obtain narcotics from the provider illegally and may disclose information about what he believes to be physical or psychological child abuse.

Public health authorities, too, are allowed information needed to conduct such duties as controlling public health hazards, the act stated.

In the case of an action or decision adversely affecting a patient based on heath care data, the patient may request that the information be transferred to a physician, who will then interpret it for the patient.

Such cases may include the denial of an insurance policy, or denial or termination of employment for health reasons, for example.

Amend or Expunge

After the patient has reviewed the information upon which the adverse decision was based, he may request the third party to amend or expunge the record.

In any case, the patient has the right to place into the file his view of the correctness or relevance of the existing information, and that view must at all times accompany the file, according to the act.

Under the act, confidential health care information is not subject to compulsory legal process in any type of proceeding except, for example, when an individual introduces his physical or mental condition as an element of a claim or defense in court.

A physician can disclose information to the court if he concludes the patient should be treated for a mental illness or if the patient disclosed information to him after being told it would not be privileged.

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Three Nations to Pass Privacy Laws in '79, More May Follow Suit

By G.Russell Pipe
Special to CW

AMSTERDAM, The Netherlands — Denmark, France and Norway will be implementing privacy laws this year and the parliaments of as many as five other countries — including Belgium, Finland, Luxembourg, The Netherlands and Spain — are expected to complete action on similar statutes.

Like those European laws that preceded them, these are expected to take an omnibus approach — imposing similar rules on the public and private sectors, establishing independent regulatory authorities, applying to automated DP as well as "sensitive manual records" and giving data flowing across national boundaries equivalent protection.

Several forces beyond general public and political support are driving privacy laws — or data protection acts, as the Europeans term them. These are:

- Constitutional rights to information privacy.
- The proposed introduction of personal identification numbers (PIN).
- The decennial census.
- The need for reciprocity for protected foreign data.
- International prodding.

As for constitutional rights to information privacy, Article 18 of the Spanish constitution provides for privacy rights, which are among the items to be incorporated in the revised Belgian and Swiss constitutions. Austria used a constitutional mandate to justify its strong data protection act.

The idea of PINs, proposed in several countries, has been attacked and the governments of Belgium, Luxembourg and The Netherlands have promised to approve privacy legislation concurrently. This was also a quid pro quo in Austria.

The decennial census of population will be conducted in Europe during 1980 and 1981. A controversy erupted a decade ago over the confidentiality of census records, and several countries want to reduce public resistance to headcount questions by getting privacy protection on the statute books soon.

Providing reciprocal protection to foreign data is increasingly important to officials of countries only now preparing legislation. The UK's Data Protection Committee report, for example, strongly argued that the UK not become a data haven.

International prodding, while discreet, is influencing several countries to move privacy projects along. Finland, for example, sees little local need for such a law, but as a Nordic Council and Organization for Economic Cooperation and Development (OECD) member, that country is expected to complete a draft law by mid-1979.

International good citizenship may stimulate countries such as Ireland and Italy to consider legislation. Even the newest member of the Council of Europe, Liechtenstein, may not want to be omitted from the list of data protectors.

Trends Confirmed

The country which has exercised the most "studied judgment" as to the justification for domestic data protection legislation is the UK. Its long-awaited Data Protection Committee report [CW, Dec. 18] accepted most of the provisions incorporated in the six European statutes.

Even though quick action in the UK is not contemplated, this thorough, logical report should make the subject more credible to several countries, especially Australia, Ireland and New Zealand.

It is interesting to see how the newest national law, the Austrian Data Protection Act, compares with the UK recommendations.

The Austrian law does the following:

- Applies to public and private sectors.
- Applies to DP and some manual files.
- Creates a regulatory agency.
- Establishes a registry of personal files.
- Requires personal data to be collected by lawful and fair means and to be kept accurate.
- Requires that personal data be kept confidential, that its secondary use be controlled, that external transfers be logged and that security measures be adopted.
- Sets penalties for violations.
- Conditions transborder data flows.
- Gives data subjects the right to be informed or otherwise notified of personal data stored, to have access to their files and to get erroneous information corrected or deleted.

The major difference between the British proposal and the Austrian act is the manner in which legal persons are addressed. The Austrian act protects legal persons — corporations, for example — while the British proposal excludes them.

The UK recommendations are also more restrictive toward manual files and propose to create some 50 Codes of Practice for various sectors, rather than holding all organizations to the same record-keeping rules.

Transborder Data Flows

In the area of transborder data flows, the expectation of equivalency is a keystone of the laws adopted in 1978. Austria, however, has the most elaborate provisions dealing with international data flows. According to Sections 32 through 34, personal data can be transmitted abroad without the approval of the Data Protection Commission (DPC) if:

- "The data handed over [is] data of the person responsible for the processing in his ca-

(Continued on Page 22)

STATUS OF NATIONAL PRIVACY/DATA PROTECTION LEGISLATION
As of January 1979

Legislation Enacted

Austria (1978)	Germany(1977)
Canada (1978)	Norway (1978)
Denmark (1978)	Sweden (1973)
France (1978)	United States (1974)

Legislation Before Parliaments

Belgium	Netherlands
Luxembourg	Spain

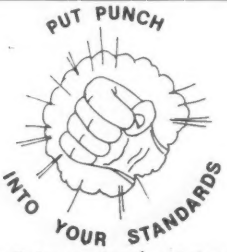
Government Report Awaiting Implementation

United Kingdom

Government Reports in Preparation

Australia	Japan
Finland	New Zealand
Iceland	Switzerland
Italy	

Source: Transnational Data Report



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Council of Europe Data Privacy Draft Delayed

By G. Russell Pipe
Special to CW

AMSTERDAM, The Netherlands — The Council of Europe's draft convention (treaty) for the *"Protection of Individuals With Regard to Automated Data Files"* has been delayed because of disagreements among members of its expert committee on several provisions. The conflict over the provisions and the exact impact the instrument will have on present national data protection regulations are two points that stand out.

A drafting group will meet twice in the spring with a possibly final plenary session of the expert committee in May. If approved at that time, the draft would be presented to the Committee on Legal Cooperation before being submitted to the Council of Ministers.

"Guidelines on Basic Rules Governing the Transborder Flow and Protection of Personal Data and Privacy," a nonbinding agreement, is being hammered out by an Organization for Economic Cooperation and Development (OECD) expert group under the chairmanship of Justice Kirby of Australia. The OECD effort is under a mandate to produce the guidelines by July for consideration by its Council of Ministers from the 24 member countries.

The second meetings of the expert group and drafting party were held in December, and two additional meetings are scheduled. The U.S.-proposed guidelines, as well as other national views and principles embodied in the Council of Europe convention, are being scrutinized.

The European Parliament's Subcommittee on Data Processing and Individual Rights is due to submit recommendations to the Legal Affairs Committee and the full parliament in the spring. Presently, the parliament exerts only moral persuasion on the commission, the executive organ of the European Economic Community (EEC).

When a popularly elected parliament is seated next fall, there are signs that data protection advocates may become more vocal and have greater impact on EEC institutions. The commission itself seems to be awaiting some concrete results from the Council of Europe and OECD before defining a possible directive for its nine member states.

Emphasis in Europe during 1979 certainly will be placed on fulfilling legislative requirements such as establishing regulatory authorities, preparing registration programs and explaining the laws to government and private organizations which must soon comply.

Second-Generation Data Protection

Nevertheless, the shadow of a second generation of data protection is forming. This seems to involve at least four areas of concern:

- Legal entities or "persons," which officials in some countries feel deserve the same rights under data protection laws as individuals, such as access to files held by government and other private enterprises. Experience in Austria and Norway will no doubt color how realistic and necessary the legal person issue is considered by European politicians.
- Manual files, which have come to be seen as a necessary and logical extension of EDP privacy law, even though technology — rather than the inherent danger of misuse of personal information — is considered the basic threat to personal interests.
- The social impact caused by new ways of using personal information. Electronic mail, electronic funds transfer, group data, statistical profiles and social modeling, as well as increased dependency on computerized information systems, are among the areas contemplated for investigation in some countries. Should government regulations be deemed necessary to protect social interests affected by these developments, the independent data protection authorities may be charged with new responsibilities.
- Nonpersonal data, which is increasingly seen to require higher levels of government protection for accuracy, reliability, security and integrity of application than personal data. If national regulations are formulated, data protection bodies seem to be logical enforcement agencies.

Whether new legal regimes are needed or will be created by nations or international organizations is conjectural. What is certain, however, is the appreciation for the important political, economic and social roles of information in industrialized societies of Europe.

Symposium Set On Reliability

CAMBRIDGE, Mass. — The Symposium on Specifications of Reliable Software, sponsored by the Institute of Electrical and Electronics Engineers (IEEE), will be held here April 3-5 at the Hyatt Regency Hotel.

The conference will examine precise requirements and measurements for large-scale systems in light of current developments in software engineering, the IEEE said.

Topics will range from systems requirements to verification of systems specifications, and time is reserved for discussion and participation.

The advance program can be obtained from Dr. Marvin V. Zelkowitz, P.O. Box 639, Silver Spring, Md. 20901.

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Georgia Checking Medicaid Overpayments

By Jay Woodruff
CW Staff

ATLANTA — The Georgia State Department of Medical Services has begun a review of its Medicaid claims payments to determine whether a recent automatic overpayment to anesthesiologists affected still other doctors. According to department officials, the overpayments may have resulted from incorrect programming that caused the CPU to pay amounts in excess of the claims.

Until officials here conclude their review, it will not be possible to say how large or how widespread the overpayment was, according to Tap Carey, a Department of Medical Services official who is looking into the case.

The error was discovered by a Medicaid office clerk while she was going over payments to physicians. A payment that was higher than the amount of the claim itself caught her eye, and officials investigated it.

Computer Paid Double

A check revealed that not only had the computer failed to reference the amount of the claim against standard allowable Medicaid payments, it apparently paid double the face amount of the claim.

Anesthesiologists as a group were overpaid, according to Carey. "Now we have to determine if the system made overpayments to all accounts that were submitted and, if so, for how long," he said.

Officials are concerned that the computer may have handled other accounts in the same manner. "We're placing people with calculators at the computing center, a separate state government agency, to determine what areas are being improperly processed," he noted.

No Facts Yet

"Right now I don't have a figure on how much money is involved; I don't have names; I don't have anything that we have researched enough to publicize," said Carey. If a "tremendous overpayment" for an extended time period really occurred, there will be a lot of problems.

For instance, there would be the problem of how to get back the federal and state funds, he noted.

An *Atlanta Journal* account of the overpayments reported that as many as 290 Georgian anesthesiologists routinely received payments for claims on work that they performed on Medicaid patients. Overpayments could have been made for as long as a year, the newspaper said.

"There is no indication that anybody was trying to beat us out of anything," Carey stated, adding that the computer that generated the overpayments has been taken out of service for reprogramming. A letter from the Department of Medical Services to area physicians advised them to continue submitting their claims while the department works to determine what went wrong.

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Three to Effect Privacy Laws

(Continued from Page 20)

pacity as data subject."

- "The data [is] made available in a country in which such data [is] subject to data protection comparable to the protection given by this Federal Act."
- "Arrangements under public international law so provide."

However, in cases where DPC permission is necessary, approval will be given if:

- "No public interests including obligations under public international law are jeopardized."
- "Data are made available within other requirements of the law."
- "Satisfactory proof is furnished that no interests of the data subject warranting protection are jeopardized by making the data available abroad."
- "Foreign processing services ensure adequate security safeguards."
- "Registration requirements with the DPC are observed."
- "The Federal Chancellor determines that foreign data protection requirements are equivalent to those in Austria."

These six conditions also apply when only part of the DP operations take place in Austria or if direct access to data processed in Austria is possible from abroad.

Data on Foreigners

Data pertaining to foreign individuals that is processed in Austria must be handled in the same manner as data pertaining to Austrian citizens — that is, the systems must be registered and approved by the DPC.

The Norwegian Personal Data Register Act requires a special export license for data prior to its communication abroad.

As a means of simplifying this procedure, the statute gives the king the authority to cooperate with other countries which establish agencies similar in function to Norway's Data Surveillance Service.

Denmark takes a less formal approach to private-sector foreign data transfers, requiring only that a legal relationship exist between the Danes' sending and foreign receiving organization and that adequate measures for ensuring compliance with the Danes' rules are observed.

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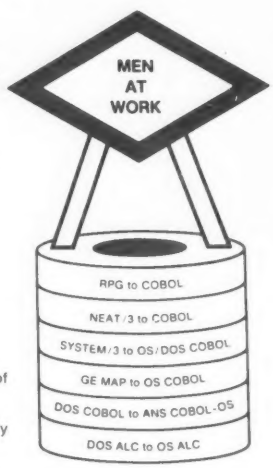

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DP Directory Published

NEW YORK — For $21.50 you can get a whole lot of information about a whole lot of information in R.R. Bowker Co.'s *Information Market Place 1978-79: An International Directory of Information Products and Services.*

The book is arranged in seven major sections, including "Information Production," which identifies and describes some 400 data base publishers, the 1,000 machine-readable data bases available from them and 1,200 "printed information products," according to a Bowker spokesman.

"Information Distribution" provides contact information, products, publications and services of 100 on-line vendors, library networks and telecommunications networks. The third section, "Information Retailing," furnishes contact information on almost 200 centers that collect, analyze, evaluate and process raw data.

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"Associations & Government Agencies" includes those here and abroad and "Conferences & Courses" covers data base creation, access and publication, library automation and "all aspects of information storage and retrieval," the spokesman said.

The 270-page book's last section deals with "Sources of Information," listing reference books, periodicals and newsletters.

Available in North and South America from Bowker, the volume is published outside those areas as *Information Trade Directory*, available from Learned Information (Europe) Ltd., Besselsleigh Road, Abingdon, Oxford OX13 6EF, England.

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Managers on the Move

J.R. DALAL has been appointed manager of management information systems for the Brookhaven National Laboratory in Upton, N.Y.

Prior to joining Brookhaven, Dalal was director of systems and DP for Teledyne CAE in Toledo, Ohio.

Dalal holds a bachelor degree in mechanical engineering from Gujarat University in India and a masters of science in operations research from Wayne State University.

• • •

FRANK P. COY has been named corporate director of management information systems at Ipco Hospital Supply Corp. in White Plains, N.Y.

Prior to joining Ipco, Coy directed the management information system functions for Echlin Manufacturing Co., Dictaphone Corp., and Ingersoll-Rand Co. He also held management positions in engineering design and development and materials control.

Coy holds a B.S. degree from MIT and an M.S. degree from the University of Rhode Island.

• • •

MARTHA L. RYAN has been appointed manager of management information systems at Digital Equipment Corp. in Phoenix, Ariz.

Ryan joined DEC after 16 years in data processing at the General Electric Co. She served most recently as manager of information systems at GE's Nuclear Energy Business Group in San Jose, Calif.

Ryan received a B.A. degree in mathematics from George Washington University.

• • •

JAROSLAV W. KRYSHTALSKY has been named a vice-president of the Securities Industry Automation Corp. (Siac) in New York City.

Kryshtalsky joined Siac in 1975 as director of management controls.

He is a graduate of Columbia University, where he received a degree in economics.

• • •

COLIN M. WILLOUGHBY has joined Marshall Foods, Inc. in Marshall, Minn., as corporate DP manager.

Willoughby was manager of systems and programming for Data 100 Corp. and previously served in a similar capacity for Control Data Corp. in Australia.

• • •

DUWAYNE J. PETERSON has been elected administrator of Security Pacific National Bank's Automated Data Processing Department.

Before joining the Los Angeles bank in 1977, Peterson held senior executive positions with RCA, Citibank and the Ford Motor Co.

He holds a bachelor of science degree from MIT and a master of business administration degree from the University of California at Los Angeles.

• • •

DOUGLASS A. WILLIAMS has been named vice-president of information services for Kaiser Foundation Health Plan, Inc., and Kaiser Foundation Hospitals in Oakland, Calif.

Williams formerly developed and managed information and computer systems for the Northern California Region of the Kaiser-Permanante Medical Program.

He holds a degree in mathematics from San Jose State University.

• • •

Calendar

March 10-April 28, Philadelphia — **CDP Refresher Course.** Contact: Philadelphia Chapter of the Data Processing Management Association, P.O. Box 2177, Philadelphia, Pa. 19103.

March 15-16, Cockeysville, Md. — **Data Processing Management Association Region 11 '79 Conference.** Contact: George Henneman, Sun Life Insurance Co., P.O. Box 13432, Baltimore, Md. 21203.

March 16-21, Lincoln, Neb. — **Technical Leadership Workshop.** Contact: Ethnotech, Inc., Rural Rte. Two, Lincoln, Neb. 68505.

March 16-17, Miami, Fla. — **Strategies in Litigation Information Management.** Contact: Aspen Systems Corp., 20010 Century Blvd., Germantown, Md. 20767.

March 18-23, San Francisco — **Share Meeting 52.** Contact: Share, 1 Illinois Center, 1111 E. Wacker Drive, Chicago, Ill. 60601.

March 19-21, Washington, D.C. — **Federal DP Expo.** Contact: Sheldon G. Adelson, President, Interface Show Group, 160 Speen St., Framingham, Mass. 01701.

March 19-21, New York — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 28-30 in Washington, D.C.

March 19-21, New York — **Development Computer-Based Accounts Payable Systems.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

March 19-21, Philadelphia — **Fifth Annual Conference and Exhibit on Industrial and Control Applications of Microprocessors.** Contact: Michael A. O'Bryant, Director, Expositions & Publications, Information Gatekeepers, Inc., Suite 212, 167 Corey Road, Brookline, Mass. 02146.

March 19-21, College Station, Texas — **Control of Power Systems,** sponsored by the Institute of Electrical and Electronics Engineers. Contact: Control of Power Systems Conference & Exposition, Department of Electrical Engineering, Texas A&M University, College Station, Texas 77843.

March 19-23, New York — **The New DP Environment and How to Design for It,** presented by James Martin. Contact: Technology Transfer, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

March 19-23, New York — **Fundamentals of Computer Systems Analysis and Design.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

March 20-23, Dallas — **Ices Users Group, Inc.** Contact: T.W. Cook, Boeing Computer Services, Suite 832, 1111 W. Mockingbird Lane, Dallas, Texas 75247.

March 21-23, San Francisco — **Performance Evaluation Seminar.** Contact: Technology Transfer, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

March 22, Madison, N.J. — **The Effective Use and Selection of Minicomputers for Business Applications.** Contact: Joseph L. Tramutola Jr. Florham-Madison Campus at Fairleigh Dickinson University, Madison, N.J. 07940.

March 22-23, Santa Barbara, Calif. — **Data Processing Management Association Region 1 Conference.** Contact: Robert Montgomery, KHJ Division of RKO General, 5515 Melrose Drive, Hollywood, Calif. 90038.

March 22-24, Portland, Ore. — **Wes/Com Future Fair.** Contact: Wes/Com, P.O. Box 4047, Portland, Ore. 97208.

March 23, Los Angeles — **26th Annual Meeting of the Digital Computer Association.** Contact: John Kirkley, Datamation Magazine, 1801 S. La Cienega Blvd., Los Angeles, Calif. 90035.

March 26-27, Los Angeles — **Data Communications: Advanced Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 26-28, Houston — **DP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 26-28, Boston — **Satellite Data Communications Seminar.** Contact: Technology Transfer, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

March 30-31, Lafayette, La. — **American Business Communication Association Southeastern Convention.** Contact: Dr. Robert Gray, Department of Business Communication, College of Commerce, University of Southern Louisiana, Lafayette, La. 70504.

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Paper on Speech Synthesis Gets ROTC Cadet Honors

NEW YORK — A senior U.S. Air Force ROTC cadet's research project has been judged the best of six papers presented at the Institute for Electronic and Electrical Engineers (IEEE) Second International Computer Software and Applications Conference (Compsac) recently.

"The Construction of Sentence Pause and Intonation in Computer Synthesized Speech" brought Derek Meyer the honor, a plaque, a certificate and $150 from Compsac.

Meyer, the ROTC cadet group commander at North Carolina State University and a student in the Computer Sciences Honors Program, won over three doctoral candidates and two other undergraduate students who also wrote papers.

Meyer is scheduled to graduate in May and will then be commissioned as a second lieutenant in the Air Force. He hopes ultimately to test airplane computer systems for the Air Force.

Aviation Application

One application of his research into computer speech, Meyer said, could be in furnishing a pilot with information for which he may not have time to look. Such data would be transferred from an aircraft's computers to a speech synthesizer and then broadcast to the pilot, Meyer projected.

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Singers Harmonize Administrative Tasks

By Marguerite Zientara
CW Staff

KENOSHA, Wis. — The Society for the Preservation and Encouragement of Barber Shop Quartet Singing in America has harmonized its membership administration and inventory management by using a minicomputer.

With more than 36,000 members in 780 chapters across the U.S. and most of Canada and with chapters in the UK, West Germany and Sweden, the society felt the need for some kind of automation to keep track of such large numbers, according to Frank Santarelli, DP and accounting services manager.

After first using an IBM accounting machine for its paperwork, seven years ago the society acquired a Honeywell, Inc. Model 58 computer with 10K bytes of virtual memory.

The society had considered equipment from both IBM and Honeywell, but decided on the Honeywell Model 58 because it offered "the most for our money," Santarelli said. Equipment from other vendors "didn't come close" to meeting the group's needs, he added.

Other Functions

In addition to storing individual membership and chapter information, the Model 58 maintains and administers an elaborate inventory of such items as sheet music, keychains, T-shirts, sweatshirts and jackets carrying the group's insignia.

The society does a year-round direct-mail business in those items. It also sells them at its various regional meetings and songfests and at its annual convention.

Although tax exempt, the society and its chapters are required to file yearly transaction summary documents with the Internal Revenue Service. The Model 58 gathers the data and prepares those summaries, Santarelli said.

The system also does the payroll for the society's 30 employees here and performs the bookkeeping and accounting functions.

Expecting New System

While the Model 58 has run smoothly for the past seven years, the society expects the arrival of a Honeywell Series 60 Level 62 minicomputer with 160K bytes of main memory "any day now," according to Santarelli. "We needed to upgrade our Model 58, and it's cheaper to get a new machine than to add a piece of equipment to the old one."

The Series 60 machine will include two disk drives, a 300 line/min printer and two VIP 7700 CRTs.

Seminars Planned On DP Security, Computer Crime

LOS ANGELES — In the face of increasing losses from computer theft, two spring seminars dealing with computer crime and DP security have been organized by Technology Transfer, Inc. here.

A three-day seminar entitled "Fighting Computer Crime" will be held April 2-4 in Washington, D.C., and a three-day seminar on "Encryption for Computer Communication Security" will take place April 30-May 2 in San Francisco.

Conducting the session on computer crime will be Donn B. Parker and Robert P. Abbott.

Alan Konheim, a cryptography expert, will conduct the seminar on data encryption. The cost for each three-day seminar is $595. Additional information can be obtained from Technology Transfer, Inc., P.O. Box 49765, Los Angeles, Calif. 90049.

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THE FORTUNATE 96.

Three Viewpoints Presented

Presidential Advisors Debate Patent Ownership

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Who should own and control patents on products and processes developed with federal funds was the subject of major disagreement among members of the President's Domestic Policy Review of Industrial Innovation Advisory group who met here recently.

The patent controversy was seen from three basic viewpoints: industry, labor and the public interest.

The advisory Subcommittee on Procurement and Direct Support of Research and Development noted that at present "there is no uniform government policy for determining the allocation of rights in the fruits of government-funded R&D."

The subcommittee recommended that the government develop a policy "specifying that the contractor has the right to retain title to all patents developed under government funding, reserving for the government the right to use or require the contractor to license the use of the patent under reasonable terms and conditions."

A separate report on patent policy by the Advisory Subcommittee on Patent and Information Policy agreed with the procurement and R&D group's recommendation, maintaining that "experience has shown that the government, as a purchaser or consumer of goods and services, is not in a position to take advantage of its ownership of patents to promote enterprise.

"Private companies, on the other hand, are unwilling to take a nonexclusive license under a government-owned patent and commit the necessary funds to develop the invention, since it has no protection from competition. This is a major reason that more than 90% of all government patents are not used."

The patent advisory group said that although "what the government pays for belongs to the people," the question is "what instrumentalities can be brought to bear to maximize the possibilities that the people will indeed have available the fruits of their government's expenditures."

The group therefore recommended "transferring the patent rights on the results of government-sponsored research to the private sector for commercialization."

The labor contingent of the industrial innovation policy review, however, strongly objected to that point of view: "We insist that patents created by private business with U.S. taxpayers' dollars must not become private proprietary rights of private business. Titles to such patents should be held by the U.S. and should be placed in the public domain under royalty-free cross-licensing provisions."

Public interest representatives took a more cautious approach, saying the question should be considered within the "larger context" of a "thorough review and, presumably, reform of patent law."

PROBLEM:

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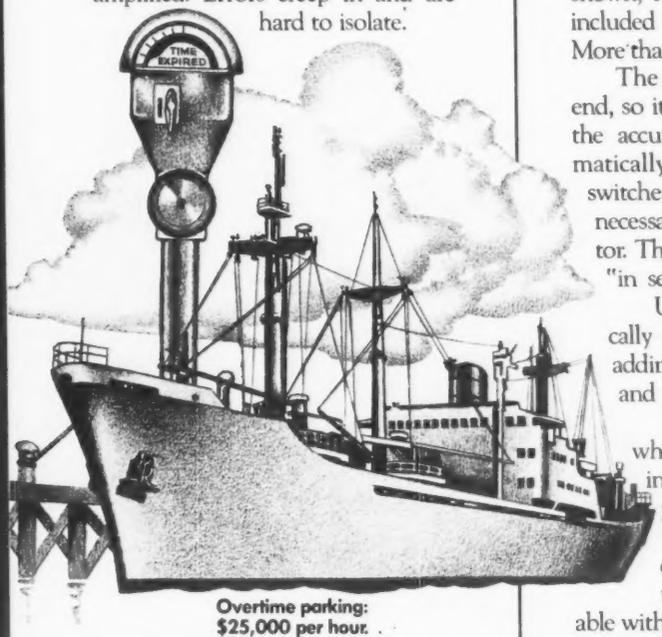

Overtime parking: $25,000 per hour.

Whole blocks of data are jeopardized. And retransmissions eat up valuable computer and line time.

Delays can have very expensive consequences. On the order of $1,000 per hour per circuit for time-sharing firms. Twenty-five times that for a company with a ship held in port by faulty documentation. Ulcers for a data processing manager transmitting month-end reports to the home office.

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Figure 1

Figure 2

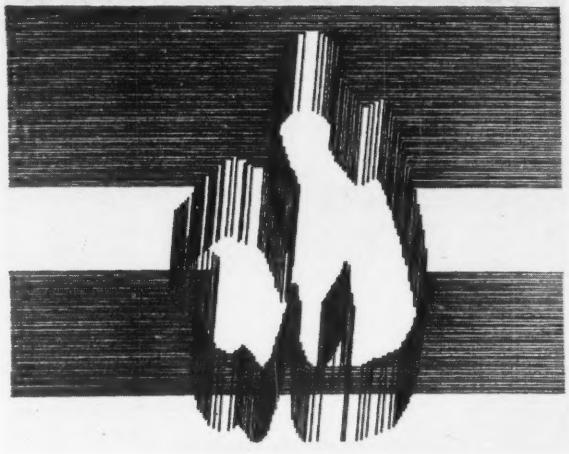


Figure 1 shows one of the six untitled bronze sculptures that served as the starting point of Jacobson's computer-assisted work; Figure 2 is a computer-generated image in which the bronze is reduced to two dimensions. Figures 3 and 4 are enlarged computer-generated two-dimensional sculptures that dramatize the small 'building modules' of a strong, bold image.

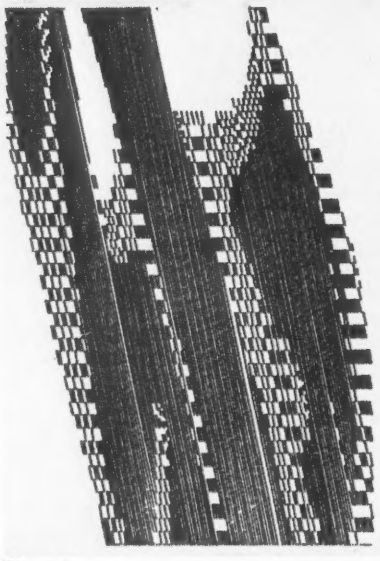


Figure 3

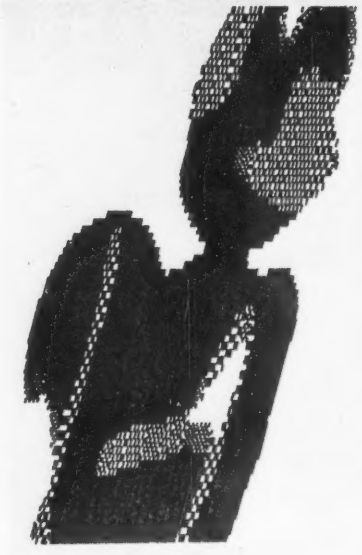


Figure 4

Computer Broadens Sculptural Vocabulary

Without Detracting From Work's Organic Character

By Marguerite Zientara
CW Staff

NORTHFIELD, Minn. — In an effort to intensively explore sculptural form and shape and to "expand his vocabulary," an artist developed a complex process of computer manipulation that enabled him to reduce three-dimensional sculpture to two dimensions.

"Although sculpture is three-dimensional, we see it as a series of silhouettes; the edges of shapes are always very important," according to Ray Jacobson, a sculptor for 20 years and currently the chairman of the art department at Carleton College here.

"I wanted to emphasize the silhouette aspect by starting with the three-dimensional form and then extend it into a flattened image," he explained.

To implement his plan, Jacobson created six small-scale sculptures cast in bronze to be analyzed by computer. While his sculptures can be classified as "vitalistic," or echoing the vital, growing and changing forces in nature, he planned to use the apparently contradictory technological tools of the day to dissect those factors.

"It was an adventure on my part, as well as a friendly overture to the computer so that I could come to a better understanding of it and a closer, friendly position to it," he said.

"One clear reason I wanted to use the computer for this piece of work was that, being quite aware of the impact of the computer on our daily lives in this technical culture, I wanted to try to utilize it as a tool rather than something to be feared or suspected," he added.

In beginning his project last spring, Jacobson first approached the DP personnel at the college seeking two technically oriented students who might have the "initiative, sustained interest and flexibility" to work on a student-teacher team effort of this kind. The students were recruited, and Jacobson began laying the groundwork for the actual computer interaction.

The artist first made the six small bronze sculptures (approximately 4- by 3.5- by 3 inches high) and had them photographed from several different angles (Figure 1). He then made simplified drawings from the photographs, recording the contours as well as the dark and light areas of the photographs.

Customized Grid

With the help of the students, Jacobson transferred the simplified drawings onto a specially made, transparent grid placed over the drawing, coding each point of the drawing according to its gray, black or white value.

The customized grid was calibrated in squares 1/16th of an inch square, totaling several hundred points and resulting in an exact record of the drawing's configuration against the grid.

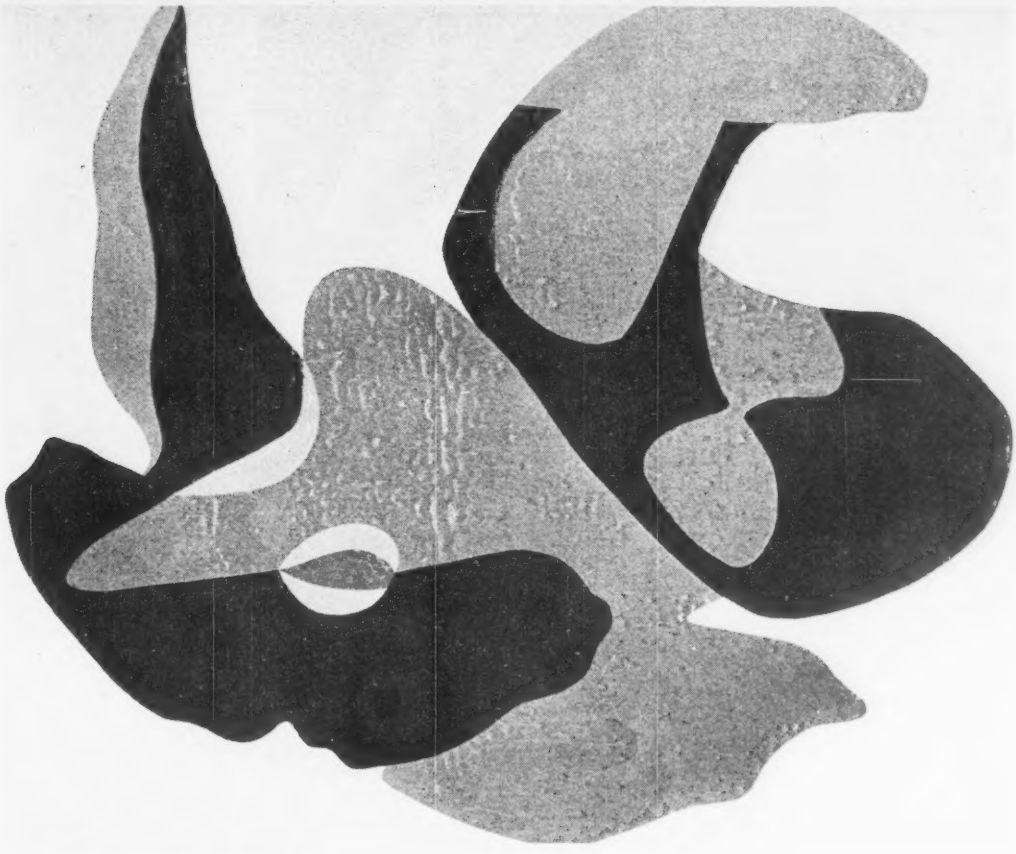
That information was input through a Tektronix, Inc. 4006 printer terminal to the school's Digital Equipment Corp. PDP-11/60 minicomputer running under the RSTS/E operating system. The result was 24-inch-long printout sheets holding the factual information about each drawing.

Next a Carleton student wrote a "rudimentary" program whereby Jacobson's shapes could be stretched, shrunk, expanded and juxtaposed on a CRT. The school's summer recess took that student away, and the work was continued by another student, Andy Luebker, now a sophomore at Carleton.

Manipulation on CRT

Working in Basic Plus, Luebker refined the original program to allow full manipulation of the drawings' shapes on the CRT (Figures 2, 3 and 4). "I could expand each drawing in horizontal or vertical directions [at the CRT] just by changing the scaling of the screen," he explained.

To do that, he used Middlebury



The acrylic on canvas (above), painted by Jacobson, incorporates aspects of all the computer-generated images. Jacobson considers it 'two-dimensional sculpture.' Its actual size is 48- by 60 inches. In photo at left, the artist is shown at work in his studio.

College's Plot 06 plotting program, which would allow him to plot horizontally or vertically any number of units per inch.

"I had to write my own routines for some things, like rotations," he noted. "There were instances when I set out to do something, and the routine I wrote wouldn't do exactly what I had planned. This would give it a controlled randomness that I found Ray liked, whereas I just thought of it as a software bug."

Luebker and Jacobson sat at the CRT "by the hour and by the day," working with the images "in an ongoing way, responding to the images on the spot in a direct minute-by-minute manipulation of the computer," Jacobson recalled. He acted as the artistic director while Luebker handled the technical details.

"We used the computer truly as a tool, giving enough information to get a very brief result, responding to that result and constantly changing the image, guiding the computer toward usable results," Jacobson commented. "In that way it was like working on a canvas."

Computer 'Very Seductive'

According to Jacobson, his artwork using the computer differs from other computer artwork in its flexibility. "Others may input a rather complete program to the computer and the result comes out reflecting that program, whereas ours was a very flexible, inquiring experimental approach," he pointed out.

"Very importantly," he added, "I didn't permit the computer to give us any forms that weren't a direct reflection of the bronzes. I know the computer is very seductive and can produce some very interesting imagery, but for me it tends to be a 'junk image' and we tried to avoid that."

While the students were "conditioned" to try to eliminate errors in programming because of their proficiency in computer science, in the artwork the errors could work to the advantage of an image. "This was a kind of an enlightenment for the students," the artist said.

After producing 100 workable images reflecting the characteristics of the three-dimensional bronzes on a flat surface, Jacobson selected five of the images printed by the computer and had them photographically enlarged to 40- by 60 inches (Figures 3 and 4).

These large sculptures dramatize the computer language itself and the shape qualities derived from the small-scale bronzes. "I don't think there's any way that I or probably anyone else would have come up with those images starting with pen, brush and paper," he remarked. "They are totally the computer's."

Paintings Represent Composite

From those large, two-dimensional "sculptures," Jacobson went a step further and painted five large acrylics on canvas (Figure 5), which he also calls two-dimensional sculpture.

The acrylic paintings are a composite of all the previous processes — bronze sculptures, photographs, drawings and computer programs. "Although the acrylic images hark back rather directly to the sculpture, they also are very reflective of some of the computer images [not shown here]," he noted.

In the future, Jacobson may execute larger, three-dimensional sculptural forms working from the computer-generated images he has.

The use of the computer in sculpture has broadened his sculptural vocabulary, Jacobson said, without taking him in a different direction from the usual "organic" nature of his work.

'Erosion Effect'

"There was an erosion effect going on," Jacobson explained. "Just as natural forces wash and shape a rock with water, sand or wind and give shape to the world around us, I was nursing these forms, orchestrating the shape of the computer images.

"These works represent a combination of natural forces and technology."

Jacobson thinks that the computer art that exists today "is only the beginning of what is possible. I think perhaps the computer will become more blended with the creative process and will be used as a traditional art tool in a more flexible way than it has been previously."

Although Jacobson intends to use the computer "from time to time" in his artwork, he has no idea what the ultimate result might be. "I don't have any particular end or direction in mind, I just know it is potentially very useful and I'll do some further exploration with it," he said.

Editorial

Good News, Bad News

The announcement of the IBM 4300 mainframe line was like a "good news, bad news" joke for computer users.

The good news was obvious — the lower hardware prices which offer users more performance for each dollar spent [CW, Feb. 5]. These price reductions are probably the most significant in the history of the DP industry.

The bad news was the increased prices for software and software support, which will make the purchase decision more difficult than it has been in the past.

To consider both sides of this issue, let's look at a theoretical user with a 2M-byte IBM 370/138 who is considering moving to a 2M-byte 4341.

For the sake of this example, we'll use the basic processor costs because we'll assume that peripheral devices are the same for either mainframe. (In real life, however, they may not be; the peripherals announced with the 4300 series will not presently run on 370 equipment.)

The 4341, priced at $248,760, offers the user 3.2 times more processing power than the 370/138, which is priced at $346,260. On hardware alone, the 4341 is a clear winner — more power for less money.

But let's assume that the user is running DOS/VS with Power/VS, Vsam and Btam, all of which are free at present. With the 4341, not only will the user have to pay for each of these, he will also have to purchase VSE/Advanced Function, a program product that was previously available but not required.

The total costs for this software will be $303 per month or $18,180 over the expected five-year life of the system. That includes both the monthly license fee plus the new support fee.

With these charges, the gap between the two systems has narrowed, with the 4341 now costing $266,840 compared with $346,260 for the 370/138 over a five-year life.

The 4341 user will also have to pay for some minor parts of the operating system that were previously free. If the average cost is $200 more a month, this adds another $12,000 over the life of the system.

Furthermore, IBM is now charging both the 370/138 user and the 4341 user for operating systems support if the user wishes to have on-site, on-call service. In the case of the 370/138, this will amount to $285 per month; the 4341 user will pay $570 per month. The difference comes to $285 a month more for the 4341 user — or $17,100 over five years.

These two items add $29,100 to the 4341 price, bringing it to $295,940, still considerably under the price of the Model 138 from IBM.

However, there are now several alternatives to IBM for 138-class machines, including CPUs from software-compatible processor manufacturers, third-party leasing firms and used equipment dealers. All offer considerable savings when compared with the IBM prices.

For example, used equipment dealers may be able to offer the 370/138 for as low as $165,000, making it considerably less expensive than the 4341 with all of the software charges. Even on that basis, however, the 4341 would turn out to a better price/performance machine than the 138.

This example is in no way exhaustive, but illustrates the problems that users are going to face in determining what systems will best fit their needs in the future.

The 4300 systems look at first blush like the best price performers in the mid-range IBM-compatible marketplace, but users are going to have to do a great deal of calculating before they make their mainframe choices in the future.

Data Past

Five Years Ago
Feb. 13, 1974

WASHINGTON, D.C. — Congress received two parallel privacy bills that were introduced to regulate automated crime data banks such as the Federal Bureau of Investigation's Computerized Criminal History System. The bills had broad bipartisan support.

— — —

HARTFORD, Conn. — Engineering estimates at the Hartford Insurance Group indicated that by 1980, the company would be saving about 120,000 gallons of oil a year if its building were entirely heated by computer-generated heat.

Eight Years Ago
Feb. 17, 1971

LOS ANGELES — Despite an early-morning earthquake which rumbled through this city, leaving dead and injured people, widespread damage, fires and power and telephone failures, half of the DP centers were back in operation by noon the same day; nearly all were operational by the next morning. The resiliency was attributed to frequent disaster and sabotage drills and to the floating floors installed in many data centers.

— — —

LOS ANGELES — A Peace Corps composed entirely of skilled DP personnel from this country could provide the technology needed by underdeveloped countries to realize their computing needs, according to Dr. Gerald Estrin, professor of computer sciences at the University of California at Los Angeles. Estrin made the suggestion after a trip to Israel to head up the team that built the country's first computer.

Letters to the Editor

Won't Take the Blame

I have just finished reading Kenniston W. Lord's article concerning the United California Bank (UCB) brochure which explains a foul-up in bank card statements [CW, Jan. 22]. I must agree with Lord that such a publication is unconscionable. But Lord lays the blame for such trash at the door of all banks, and I take strong objection to that.

Whether Lord realizes it or not, there are tens of thousands of dedicated, bank-oriented DPers whose efforts keep the biggest paper flow in history moving on a timely basis. I don't like that irresponsible bit of journalism linking us all to the UCB brochure.

If Lord is so fed up with banks, perhaps he should pay his bills with cash, store his valuables in a coffee can buried in the ground and live in a tent in the park until he can save enough cash to pay for his home.

I might suggest, after rereading the UCB brochure, that it did not originate from either a DPer or a banker, but probably from a journalist.

James Dovre
Administrative Auditor
Puget Sound National Bank
Tacoma, Wash.

IBM Selling Its Case

In case you haven't noticed, IBM is increasing its TV advertising to the general public with messages and methods designed not to sell IBM's products or services, but something else.

IBM is selling IBM vs. the U.S. government's antitrust case and the other cases against IBM.

This demonstrates IBM's capability of yet another flagrant abuse of power, again using the subtle methods for which it is becoming famous.

I do hope justice will prevail and the national audience upon which IBM is obviously attempting to capitalize will somehow understand that full competition from U.S. companies will provide the best price/performance for the majority.

Nancy E. Tierney
Mission San Jose, Calif.

Objection to Omissions

In the editorial "Obnoxious — And Dangerous" [CW, Jan. 22], you condemn the "racist government of South Africa" and "the regime of Adolf Hitler."

I can't help wondering why you fail to include those of Russia, China, Cambodia and Vietnam. It's like leaving IBM off of a list of computer manufacturers. It smacks of prejudice.

Incidentally, I wholeheartedly agree with your condemnation of identification cards.

D.G. Graham
Opa Locka, Fla.

A Misunderstanding

In "Consolidated Computer Makes Big Profits, Unveils Products" [CW, Jan. 22], a misunderstanding about the introduction of a remote job entry (RJE) system for governmental agencies was inadvertently created.

The RJE system referred to in the article is currently installable. But the interface with our present Key-Edit equipment, other than via a communications link, is under development and expected to be operational within four to five months.

E.J. Pennick
Vice-President and
General Manager
Consolidated Computer
International, Inc.
Tempe, Ariz.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

The Human Connection

Riders Demand Rights in Overbooking Snafu

By Jack Stone
CW Staff

We DPers pride ourselves on our ability to learn from our mistakes. After all, this trait is basic to the programming mentality.

But one area of systems development has largely escaped the learning process — the installation of manual controls to handle computer system failures, particularly in those systems which interface to the public. To illustrate the point, I want to relate an incident involving the overbooking of airlines reservations. It is a particularly vivid one as I was one of the overbookees.

It all began when I approached the check-in desk in front of the gate about 20 minutes before departure time. I had confirmed my reservation by phone, had an open ticket and needed to get a boarding pass.

The ticket agent confirmed my first-class reservation on his screen, but told me, somewhat haughtily, that all the first-class seats were occupied and there was no room left for me. He offered me a first-class seat on a flight out two hours hence or a seat in steerage on the flight readying for departure.

Battle of Wills

But before I had a chance to complain about being bumped, an airlines agent came running in from the movable ramp, through the gate and up to the desk. She waved together several of her cohorts, and this story unfolded:

Somehow, the computer banged out duplicate boarding passes for seat 4A in first class. An agent had checked out the two passengers, and both held valid tickets and boarding passes; one was in the seat, the other standing near the main door of the airplane.

An agent asked the standee if he would mind taking a seat in the tourist section. He said he would mind and firmly requested his rightful seat in first class. The agent then put the same request to the sittee, who refused to budge.

An airlines supervisor entered the scene, assessed the situation, turned to the standing bumpee and asked him to go promptly to the rear of the plane since it was nearing take-off time. The standee said no. The supervisor apparently got a little hot around the collar and ordered the standee off the plane.

The preempted passenger stoically moved to the main door, put one foot in the airplane, the other on the movable ramp and said that neither he nor the airplane were moving anywhere until he was given his first-class seat plus an apology for the total mishandling of his seating, including the computer system, the supervisor's attitude — the whole nine yards.

Several burly looking agents appeared on the scene. The bunch of them scurried on board, obviously intent on getting the conflict resolved and the plane aloft. I accepted the seat in steerage because I wanted to interview the dramatis personae for this column.

The standee finally gave up after receiving apologies and took a seat in the tourist section. So ends Phase I of the Overbooking Runaround.

Fellow Suffers

During the trip, I talked with the 4A reject, who verified the story and stated his intent to carry the matter further at the destination airport. He agreed to let me accompany him.

Runaround, Phase II, began when he contacted the first agent in sight after landing. The agent told him he would have to see the "PR," an acronym for passenger representative, which left me with a feeling of distrust.

But because the PR was terribly busy with a (more) crucial mission, he wan't available for a while. The agent directed us to the main terminal counter to wait for the PR.

At the counter, we announced our presence and cooled our heels, waiting and waiting and waiting. But the PR didn't show. So we began to get hot around our respective collars. Phase II concludes.

Initiate Runaround, Phase III. I noticed a sign posted at the ticket counter that announced that overbooking situations — though unlikely — do occur, that passengers so affected may be entitled to compensation and that further information may be obtained from a ticket agent.

So I asked an agent for further information about compensation resulting from overbooking. The agent searched high and low, up and down the counters, but couldn't come up with any documentation on the subject.

With a shrug of his shoulder, the agent concluded, "Well, I sure can't find any of those slips around here. I know there are some down at the gates [where we started in Phase I]. Or, if you *really* need one, the PR usually has a few sticking out of his pocket. Why don't you wait for him?" Terminate Runaround Phase III.

The Resolution

Finally, a fatherly looking, rather exhausted gentleman with a distinctive airlines jacket appeared, listened to my client's story, apologized for the problem, promptly issued him a check for the difference in seat prices and my column subject took off.

I gave my stubs to the PR and told him, "Same problem. I understand you also may have some overbooking policy statements sticking out of your pockets. May I have one?" He passed me one and explained the compensation plan, which includes a 200% (!) fare penalty plus a free trip if a passenger doesn't make his destination within two hours of schedule because of overbooking.

The only salvation in the sordid affair, and perhaps what makes it all worthwhile, occurred when the PR noted as he handed my check to me, "Can't figure out what went wrong with the duplicate boarding pass. Must have been a human error somewhere along the line because it certainly wasn't the computer!"

Couger on Education

Bibliography of DP Continues to Grow

By J. Daniel Couger
Special to CW

For the seventh consecutive year, more than 200 new books were published on computing topics in 1978. All are listed in the 12th Edition of the *Annual Bibliography of Computer-Oriented Books*, published last month by the University of Colorado.

Notable in this year's listing is the increased quantity and quality of books on structured design and distributed processing. In addition, there are eight new books on the management of data processing.

All introductory-type books published prior to 1974 were deleted. Despite the deletions, the bibliography still contains more than 1,000 books from over 200 publishers. The bibliography separates the books into 55 categories and catalogs them according to type (reference, textbook, handbook) and style of presentation (programmed instruction, case study or narrative).

The category on advanced programming now contains 62 books. Ten new books were added, including two new volumes in Yeh's series on *Current Trends in Programming Methodology*. Examples of the high-quality books in this category are Baase's *Computer Algorithms: Introduction to Designed Analysis* and the second edition of Van Tassel's *Program Style, Design, Efficiency, Debugging, Testing*.

The section on structured design now contains six books. An important addition is Myers' *Composite/Structured Design*. The distributed systems category includes Cypser's *Communications Architecture for Distributed Systems*.

Continuing Trend

Continuing last year's trend, the section on data base increased 15% (seven new books). A new edition of Cohen's *Data Base Management Systems* is an example of the high-quality books in that section, as is *Riss: Relational DBMS for Minicomputers,*

(Continued on Page 36)

Reader Commentary

Roots of Women in DP Go Back to 19th Century

By Ida W. Mason
Special to CW

Women in the DP field may be surprised to learn that their roots go back a long way. In fact, women have been associated with computers and programming since the "early" days of the profession — days far more than 30 years ago.

Ada Augusta, the Countess of Lovelace and the only legitimate daughter of Lord Byron, was a gifted mathematician. She became interested in an early computer prototype in 1841.

She also translated a description of Babbage's *Analytical Engine* into English and went on to describe the development and potential of the machine. Later she worked with Babbage on a scheme to calculate the odds on horse races, becoming the first programmer in the process.

The Countess sustained such heavy gambling debts, however, that she was forced to pawn the family jewels.

Capt. Grace Murray Hopper, USN, earned a baccalaureate degree in mathematics from Vassar and master's and doctoral degrees from Yale. She later taught both at Yale and at Harvard, where she worked with Howard Aiken programming the Mark I, an early electromechanical computer developed between 1937 and 1944.

Hopper worked for Univac developing Flowmatic, the first automatic coding language, and went on to become head of programming languages for the U.S. Navy. Currently one of the profession's best known public speakers, she has been granted numerous awards, including the Data Processing Management Association's Man of the Year award.

Pennsylvania Trio

The trio of Adele Goldstine, Mary Mauchly and Mildred Kramer of the University of Pennsylvania's Moore School of Engineering formed a staff to train women to become "computers" or "calculators." In 1945,

(Continued on Page 34)

White Hat, Black Hat

Commercial Seminars Leave Ugly Feeling

By Dr. Herbert R.J. Grosch
Special to CW

Some readers may faintly remember a column I did back in May 1976 about the first inklings of a new Department of Defense (DOD) language. I recoiled in horror, and as Steelman and its predecessors shambled onto the U.S. and European scene, my repugnance was matched by that of others. I plan to return some day soon to the subject.

Today, though, I want to tell about a curious ongoing adventure of a much more, oh, ethical flavor that began with that 1976 meeting. A preliminary version had been held in Washington, and then a replay with the same cast of sponsors and speakers had been run in Anaheim. It was the latter that I attended and that gave rise to my article.

I objected fairly vigorously to the atmosphere of the sessions. "Contracts maketh a ready man," I said. Contractors were clamoring, DOD henchmen from think tanks were looking for study money.

It was pretty grubby, and my own association, the Association for Computing Machinery (ACM), had been a sponsor — along with IEEE Computer Society and the American Institute of Aeronautics and Astronautics (AIAA).

Well, I was not the only ACM official to think so. Our redoubtable chairman of the conferences and symposia committee also looked at this and similar meetings, quietly pointed out that a very commercial seminar factory was staging the show, procuring the speakers and presumably pocketing a pretty substantial profit.

Certainly, he pointed out, none was coming back to ACM. He recommended we not sponsor or cosponsor any more such crassness. The matter was discussed in the ACM Executive Committee, I gave supporting testimony and we withdrew.

Time passed. I became ACM president. Brochures from dozens of similar groups, advertising similar "insider" conferences, crossed my desk.

Early this year I read an unusually blatant one, promoting a meeting called "The Energy Market and the Aerospace Industry." The joint sponsors were the AIAA and the Technical Marketing Society of America (TMSA); the conference manager was State of the Art Seminars (very inconspicuously).

So I wrote the Department of Energy (DOE) on my official letterhead:

Dear Dr. Schlesinger:

I'm disturbed at a new trend in ostensibly professional seminars, which causes considerable and needless expense to government, university and industrial participants alike (and hence, ultimately, to the taxpayers). And at a deeper level, there is an ugly feeling of willing corruptibility that our American society could nicely do without.

I attach a brochure on a proposed seminar linking the energy and aerospace enterprises, governmental and commercial, and purporting for a considerable fee to show the attendees the agency targets, the R&D opportunities, the industrial contract potential, in what is baldly called the Energy Market. This is under the aegis of a major engineering society, the American Institute of Aeronautics and Astronautics, of which I am a fellow and a former president.

My own association, which is the oldest and largest (37,000 members) of the world software societies, cosponsored a similar meeting on computer software requirements for defense about two years ago. But our skeptical chairman of conferences and symposia quickly realized the unpleasant nature of the operation and recommended we withhold future sponsorship, which we have done.

I believe it is quite appropriate for agencies such as yours, or the National Aeronautics and Space Administration [NASA], or DOD, to hold public and, where absolutely necessary, classified briefings. I believe it is quite acceptable to publish survey articles and requirements in the trade press and in professional journals.

But such communication is at arms length and is as open as possible to congressional and public scrutiny. These insider frolics, at which greedy marketeers search for ripoffs and officials who hope to switch sides in the near future point out where to rip, are another matter entirely.

The computer software procurement charivari to which we lent our name drew 600 attendees. Counting the seminar fee, travel expenses, living expenses and time and overhead lost back at the ranch, there was nearly a million dollars of taxpayer money wasted, as contrasted with the preparation and staid publication of the same information.

(Continued on Page 36)

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The Taylor Report

Tax Table 'Improvement' Results in Impairment

By Alan Taylor
Special to CW

The current confusion surrounding Circular E, Table 8 for figuring out how much federal income tax to withhold [CW, Jan. 15] stems from an Internal Revenue Service (IRS) recommendation that an ambiguous tax table needed improvement. But this "improvement" turned out to be an impairment since the IRS and the Finance Act used different methods of counting days in a year — in the same calculation.

Whether the recommendation was made in a memo or by telephone is still unclear. What is clear is that deductions for dependents — at $2.74/day/deduction — continue to be calculated on the 365-day calendar year, while both the tax and the tax ranges are based on the IRS's 260-workday year.

The last time I faced so much confusion was when I checked out the old Mayan calendar, which coincidentally was based on a 365-day calendar year and a 260-day sacred year. Of the two systems, I prefer the Mayan one.

The confusion between workdays and work periods is fundamental in a tax system that deals with daily rates and period allowances. In 1978's Table 8, a pure calendar-day system, anyone who used workdays as the calculation period could have had additional tax withheld. This is because the IRS provided only a work period system, which included seven days every week.

Foiled by Finance

In attempting to provide a workday system, the IRS was foiled by the Finance Act provisions. Deduction percentages could not be correctly worked out. So the IRS published this hybrid 260/365 calendar-day system, which could have remained in use if the IRS had explained it was a seven-day-a-week system.

The correct solution would have been, of course, to have published a Table 9 to handle cases when the period was simply for workdays and to have clarified the instructions. That might have required legislative approval to permit the $1,000 annual deduction to be divided by 260 or whatever the appropriate number.

Computers certainly cannot deal with Table 8 in its current hybrid condition since they are, after all, inclined to work best on one method at a time of counting days. If you can make the necessary changes in the formula, good, but remember to fully test them before you use them on the full range of deductions. The tolerance percentages that IRS allows are given in Circular E.

(Continued on Page 40)

Annualized Wages.—Except for a daily or miscellaneous payroll period, you may multiply wages for a payroll period by the number of payroll periods in the calendar year. Figure the amount of withholding required on the total wages for the whole year. Then divide that amount by the number of payroll periods. The result will be the amount of withholding for the payroll period.

For a daily or miscellaneous payroll period, take the following steps:

(1) Multiply the total number of withholding allowances by $2.74.

(2) Subtract the step 1 amount from the daily wage.

(3) Multiply the step 2 amount by 260.

(4) Figure the amount of withholding required on the step 3 amount for the whole year using the annual payroll period table in Circular E. (Do not subtract the annual value for withholding allowances because this was taken into account in step 2.)

(5) Divide the step 4 amount by 260. This is the amount to withhold for each day of the payroll period.

These are the instructions on how to use Table 8, which appear in Circular E on Page 14 of the IRS payroll tax tables. The daily deduction per dependent is $2.74.

Percentage Method Income Tax Withholding Table

Payroll period	One withholding allowance
Weekly	$19.23
Biweekly	38.46
Semimonthly	41.66
Monthly	83.33
Quarterly	250.00
Semiannually	500.00
Annually	1,000.00
Daily or miscellaneous (each day of the payroll period)	2.74

In this table from Page 15 of Circular E, the various payroll periods and allowance deductions are compared. The daily amount is just 1/7 of the weekly deduction and 1/365 of the annual deduction. In the instructions above, however, the annual amounts are divided not by 365, but by 260, to find the daily withholding tax.

TABLE 7. ANNUAL Payroll Period

(a) **SINGLE person**—including head of household:

If the amount of wages is:	The amount of income tax to be withheld shall be:
Not over $1,420	0
Over— But not over—	of excess over—
$1,420 —$3,300	15% —$1,420
$3,300 —$6,800	$282.00 plus 18% —$3,300
$6,800 —$10,200	$912.00 plus 21% —$6,800
$10,200 —$14,200	$1,626.00 plus 26% —$10,200
$14,200 —$17,200	$2,666.00 plus 30% —$14,200
$17,200 —$22,500	$3,566.00 plus 34% —$17,200
$22,500	$5,368.00 plus 39% —$22,500

TABLE 8. DAILY or MISCELLANEOUS Payroll Period

(a) **SINGLE person**—including head of household:

If the wages divided by the number of days in such period are:	The amount of income tax to be withheld shall be the following amount multiplied by the number of days in such period:
Not over $5.50	0
Over— But not over—	of excess over—
$5.50 —$12.70	15% —$5.50
$12.70 —$26.20	$1.08 plus 18% —$12.70
$26.20 —$39.20	$3.51 plus 21% —$26.20
$39.20 —$54.60	$6.24 plus 26% —$39.20
$54.60 —$66.20	$10.24 plus 30% —$54.60
$66.20 —$86.50	$13.72 plus 34% —$66.20
$86.50	$20.62 plus 39% —$86.50

The continued use of the 260 divisor can be seen by comparing Table 8 figures with Table 7 figures. The instructions refer to "periods" and give no indication of the ambiguity in calculating days in the period, which is the key to the proper use of the table.

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Women's DP Roots Traced to 19th Century

(Continued from Page 31)

working with ballistic research data, their staff developed techniques for programming the firing tables necessary to establish artillery trajectories.

Goldstine was married to Herman Goldstine, who was instrumental in gaining government support for the Eniac project.

Kathleen McNulty Mauchly was a member of the six-woman team that eventually programmed the Eniac and was regarded as one of the best programmers on the project. Her husband John is the co-inventor, with J. Prespers Eckert, of the Eniac.

Ruth M. Davis received a Ph.D. in mathematics from the University of Maryland and for nearly six and a half years served as director of National Bureau of Standards' Institute for Computer Sciences and Technology.

She is now deputy undersecretary for research, engineering and systems acquisition for the Department of Defense.

Davis also taught at the University of Maryland and served as a consultant to the U.S. Navy. She is known for her work in artificial intelligence and various medical applications. She is a much sought after speaker.

What About Today?

One thing that these women have in common is their involvement in the early years of computer development. But how do women fare in the field today?

Women in DP tend to be concentrated in the lower ranks. They stay there longer than men do: men are promoted an average of every 12 months, while women must often wait 18 months for a promotion.

This means that in six years a woman will be promoted only four times to a man's six.

These figures reflect a reluctance to employ women in executive and managerial roles rather than in DP, however. Upper management hesitates to ask women to stay late and work unusual hours for fear of disrupting family life or endangering their safety.

In addition, women have greater difficulty traveling than men do. Getting around a strange city at all hours of the day and night can present a number of hazzards.

But how else then by such visits and on-site inspections does one get ahead?

And finally, while junior and two-year colleges with DP programs have roughly equivalent numbers of males and females, the more prestigious four-year institutions tend to have their programs concentrated in the science and engineering departments with their often clearly established male bias.

So while the DP profession doesn't overtly discriminate against women, it does tend to go along with much of the rest of the business world in relegating them to the lower ranks of the corporate hierarchy.

Women in DP today are often involved in interesting projects and innovative applications. Many can offer unique views and insights that would be of value to others in the field. Some, no doubt, are making tomorrow's computer history.

If you know of such a woman or are one yourself, send a brief profile to Prof. Ida W. Mason, Lehigh Community College, Schnecksville, Pa. 18078. From time to time, such a woman will be highlighted in these pages.

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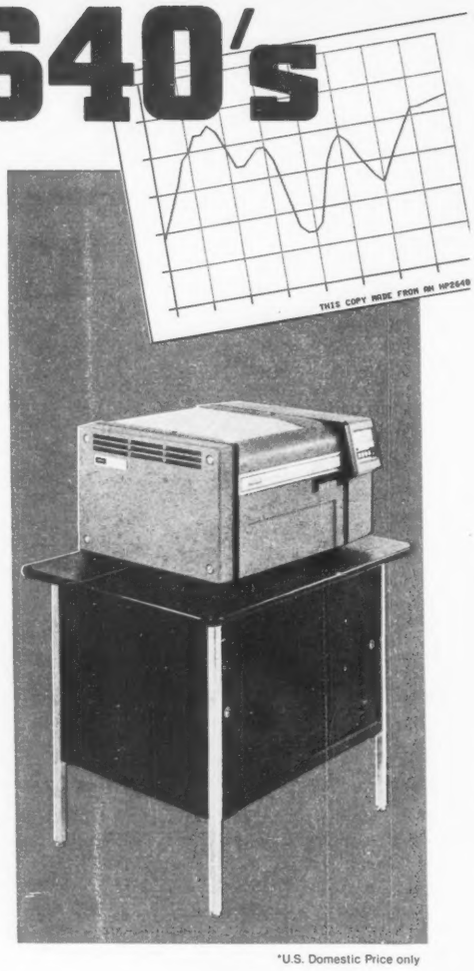

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Letters to the Editor

Zip Problem ZAPped

In recent issues of *Computerworld*, I have read readers' solutions to the U.S. Postal Service's announcement of an impending change in the Zip Code's size.

My firm, List Processing Co., markets a computerized Zip Code attachment program called ZAP. It will correctly attach the proper Zip Code to a user's record.

We have every intention of providing a product that will correctly apply any new Zip Codes that the post office comes up with in the future. A data base to accommodate the additional digits can be developed.

This solution gives the user the best of both worlds. The data will be immediately available, and the user won't need to modify his data files as he waits for a new application that would allow him to enlarge the files for permanent storage of the new code.

He can perform a gradual conversion at his convenience. I'm certain the post office will give discounts for the use of the new code.

Therefore, it would be to the user's advantage to have the codes available rather than to try to collect them from all sources of data entry input. That would be a difficult, if not impossible, task.

Donald R. Landgraf
Vice-President of Marketing
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'Professional' Seminars Leave Ugly Feeling

(Continued from Page 32)

And literally dozens of these seminars are being held each year!

Strict regulation or legislation is not needed. If agency heads, perhaps acting in response to a recommendation from the Office of Management and Budget, would simply advise their senior people not to participate in such activities, in order to preserve the decorum and the appearance of honesty so desired in government at the present time, this type of seminar would quickly wither.

Sincerely,
H.R.J. Grosch

I sent copies to the president of the AIAA, Rep. Jack Brooks, Sen. William Proxmire and the heads of DOD, Nasa and the Office of Management and Budget. I was pleased to receive a prompt and courteous reply from James Bishop, director of DOE's Office of Public Affairs.

I mustn't quote it at length, of course, but he said, "We share your concern." He also said DOE would shortly issue a directive discouraging their employees from participation "in seminars of the sort you describe." I was gratified.

The same week, I got a longer and somewhat plaintive letter from my counterpart at AIAA. While indeed saying the AIAA was discussing whether the appearance of sponsorship "may be misleading some people," he defended the purpose of such meetings: "Government leaders should and do make an earnest effort to communicate the R&D directions *and funding plans* [emphasis mine] for their fields to those best qualified to take needed initiatives in response."

That was very well written. I replied, however, "My letter said the meetings were 'insider frolics' and clearly accepted 'the preparation and staid publication' of the information. You say Uncle Sam and the aerospace/energy clan need ways to communicate. I agree. But these seminars are not among them."

Now for a coda. Last week I got yet another brochure, just like the others. The AIAA and TMSA are still sponsors, and the Society of Logistics Engineers has been added. Staging is still by State of the Art Seminars and still inconspicuous.

But there have been changes. In the original Anaheim bash back in early 1976, the key DOD figure had been one Jacques Gansler, billed as deputy assistant secretary of defense (material acquisition). His associate was Barry De Roze, a civil servant.

The 1979 update, entitled "A Candid Look at the New DOD Acquisition Initiatives," still lists the gentlemen. But Dr. Gansler is now vice-president of Analytical Sciences Corp. and De Roze is manager of advanced systems, Defense and Space Systems Group, TRW.

His topic, by the way, is "Computer Software Acquisition and Management — a DOD Initiative That Really Works."

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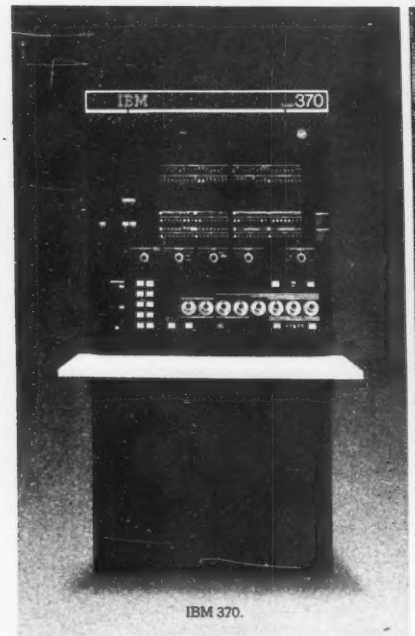

IBM 370.

CalComp 4800 I/O Set.

Bibliography Grows Again

(Continued from Page 31)

by Meldman et al.

Performance evaluation is the emphasis of three of the new books for the management of DP, e.g., Ferrari's *Computer Systems Performance Evaluation*. Five other additions were made to this section, which now totals 42 books.

It will be a surprise to no one that the section on microcomputers is burgeoning. It had a 25% increase and now totals 32 books.

Nor is it a surprise that Pascal now has a section all its own, with three new books. What might be a surprise is the absence, for the second straight year, of a new book on RPG. Fortran continued to have the most additions (12 books), closely followed by Basic (11 books) and Cobol (10 books).

While Cobol and PL/I books were quickly revised to include structured programming, the Fortran books are just now following suit. Unfortunately, few books on Basic have such an orientation.

In the system analysis area, *Cost/-Benefit Analysis: A Handbook* (Sassone, Schaffer) is a welcome addition, as is Doll's *Data Communications* in the system design section.

The bibliography contains 12 categories on comptuer applications. Twenty-four books were added to this section, among them *Corporate Planning and Modeling with Simplan* (Mayo), *Computer Control and Audit* (Burch and Sardinas) and *Computers and Local Government* (Kraemer and King).

Graphics and microprocessor design were the two areas of emphasis in the hardware section, the former illustrated by Pratt's *Digital Image Processing*.

Interest in books on security/privacy has cooled down.

Copies of the bibliography are available for $4 from Computing Newsletter, Box 7345, Colorado Springs, Colo. 80933. The cost is $5 if an invoice is required.

Couger is Professor of Computer and Management Science at the University of Colorado.

Waiting for a Decision?

Fait Accompli Only Way to Beat the System

By Robert L. Glass
Special to CW

You have to get up early in the morning to beat the system at General MPG. At least, that's what Fran Freeman did. Literally.

Sociology of Computing

The system at General MPG was as complex as that of any large bureaucracy. Nearly a dozen layers of management existed between the peons and the top. Even important decisions, like a local bus, had to make every stop in the hierarchy before being enacted ... or rejected.

As a result, simple decisions took an inordinate amount of time. Complex ones took light-years.

Fran knew all that. She also knew that one way to beat that time-consuming system was the fait accompli. Don't ask — do. It was this principle that she applied the Day of the Move.

If you have never worked for a large company, especially one with a variety of changing projects, you may find the Move a difficult concept to grasp. Put in proper perspective, the Move is a corporate game of musical chairs.

If Project A doubles in size, it needs more people and therefore more space. That may — and frequently, in this kind of environment, does — mean moving the whole project to an area where enough contiguous space is available.

But, of course, Project A's new space is probably already occupied by Project B. Those people must then be moved to make room, and the place they in turn go will also need to be vacated.

The impact of one apparently straight-forward Move decision may, in fact, result in the "pebble thrown in the pond" effect, with ripples eventually washing over undreamt-of distant shores.

Pebble Gets Thrown

Fran was standing on one of those shores when this story began. The basic motivation for this Move was the demise of the gas-guzzler.

Ten years before, the General MPG tomcat Landau had been the hottest seller in the automotive world. Its engine was bigger and its body longer than any of its competitors. A generation of teenagers had cut their automotive teeth dragging and drifting Tomcats on the strips and back roads of America.

But no more. Tomcat sales, mirroring the energy shortage of the era, had dropped to zilch. It was time for a new look and a new economy. And General MPG began just such a new design — the Pussycat.

The computing organization at General MPG is largely project-oriented. That is, instead of having a central computing function which supports all of MPG, detached groups of computists are loaned out to the projects which need them. For a long-term project like the Tomcat had been, the computing folk may even forget where home base really is.

When the Pussycat design team was formed, a half-dozen computists were assigned to work with them. And Fran Freeman was one of those people.

The formation of the Pussycat team was one of those pebbles thrown in the General MPG corporate pond. In fact, the pebble was more like a boulder. The ensuing game of musical chairs was one of the biggest Moves of the corporate decade.

When a Move happens at General MPG, the process is not what you might imagine it would be. The individual managerial and technical participants are not asked what kind of facilities they might need to best do their job.

Instead, the project manager contracts with the company facilities people for the kind of environment he wants his people to have, and facilities in turn relays the detail-level decisions to the troops: "You will have this kind and amount of space, and you will be located here."

The approach stops a lot of inter-office squabbling, but it also fails totally in optimizing worker efficiency.

Be that as it may, the Pussycat rock was to be thrown into the General MPG pond in mid-May, and the facilities' seating chart for the new area made the rounds of the troops a couple of days before. It was then that Fran noticed the windows.

If you have never worked in an acre-large bullpen of bureaucratically bound peers, you probably cannot imagine the mixture of emotions which tugged at Fran's heart over the windows. Most of the General MPG workers couldn't even see to a window, let alone out one.

If it started snowing at 9:30 a.m., General MPG folk might not know the drifts were six feet high until

(Continued on Page 40)

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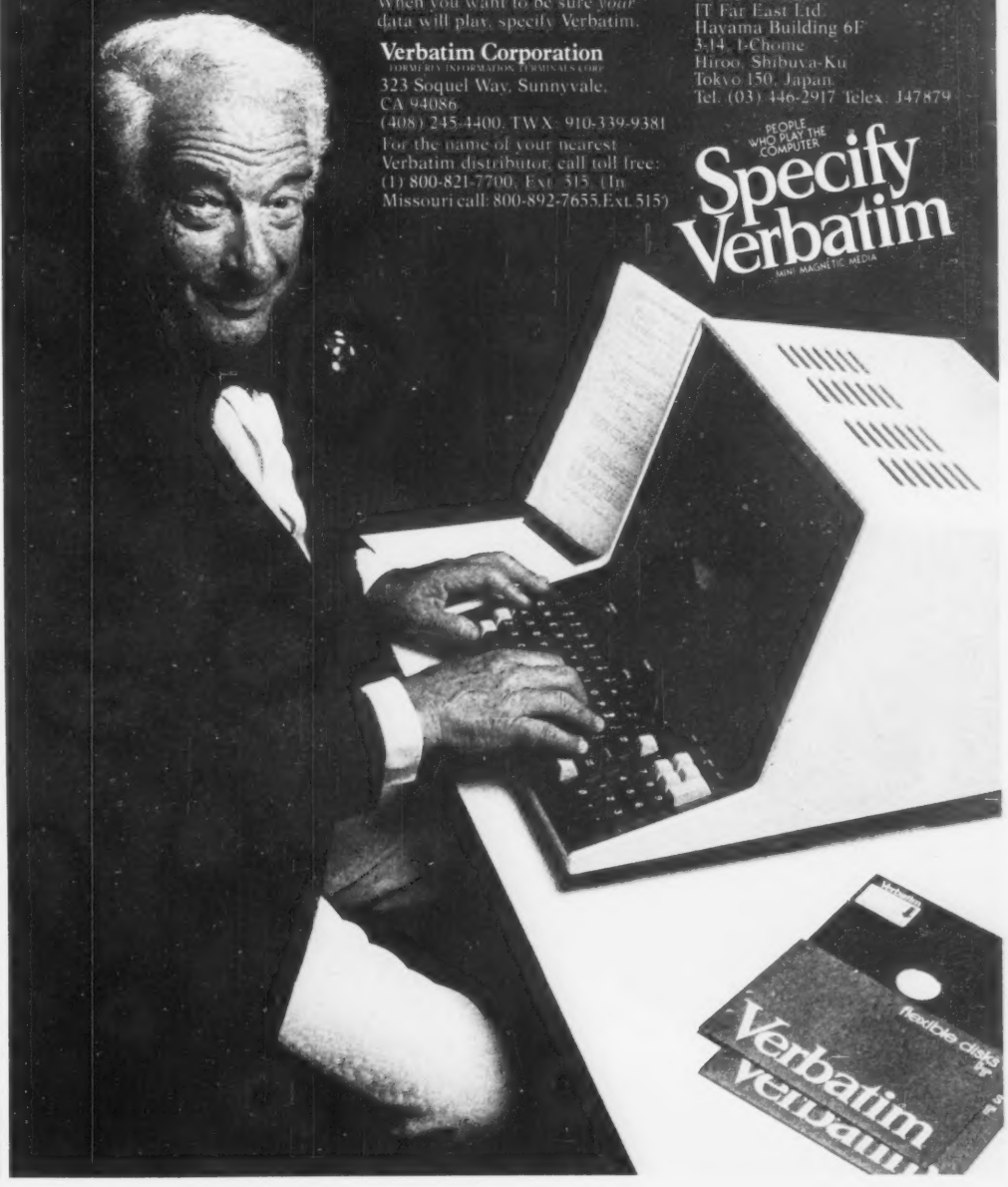

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DPer Uses Fait Accompli to Beat System

(Continued from Page 37)

they drove home in them. There was a general feeling of losing touch with the real world outside as the hours ticked by inside the company. But the windows, Fran saw, could put a stop to all that — for her.

By the luck of the draw, facilities had put the Pussycat project people adjacent to an outside wall. In fact, two outside walls. And there, on both walls, were windows.

Fran fairly salivated at the prospect. The changing seasons, visible from her own desk! There was even a tree, she knew, outside those windows, and a distant view of the mountain.

I mentioned earlier that Fran's reactions were a mixture of emotions. There was one fly, you see, in the otherwise exquisite ointment. The fly was that facilities had schematically put Fran's back to the windows — sacre bleu! — and, worse yet, two tall file cabinets stood between her back and her cherished views.

The Fait Accompli

It was then that Fran chose to invoke the fait accompli. There was no such thing as excess, she knew intuitively, in the defense of her humanitarian right to see out her windows. She laid her plans carefully.

In order to understand what happened next, you must understand how Moves happen at General MPG. Each employee notified of his impending Move must pack the contents of his desk and cabinetry into cardboard boxes. Then, in the wee hours of the second or third shift and unseen by human eyes, gnomes and elves transport the boxes to their new locations.

Knowing that facilities people and fellow employees would be swarming all over the new area at the normal 8 a.m. shift start, Fran stealthily stole to work at 5 the next morning. Sure enough, the gnomes and elves had done their work, and the boxes were in their proper place when she arrived.

Fran sized up the offending file cabinets and threw her size nine frame into the task of righting the wrong inflicted on her by facilities. Several grunts and a great deal of perspiration later, a whole new decorator touch had been applied.

Not only was Fran's desk at the juncture of the two walls, but it faced outward. From her seat, she could now see the tree, the mountain and any flights of passing fancy.

Status Symbol

Better yet, the two file cabinets were at her back, shielding her from the sea of human faces and babble which stretched across the acreage behind her. In effect, Fran had created for herself the epitome of the General MPG status symbol — a private office.

When the facilities folk arrived at 8, they were aghast. Someone, they said, had violated The Plan. The tidiness of their arrangements, viewed through their mass population viewpoint, had been Goodness . . . and this rearrangement was Badness.

"But," they lamented, "what can we do? The gnomes and elves who should right this wrong aren't here during day shift. And the lady is obviously well settled in." At last they went away.

Fran didn't notice, though. She had known all along how it would come out if she held firm. After all, even changing a fait accompli requires 12 levels of decision making at General MPG.

Besides, she was busy looking out her windows.

Glass is the author of several books about computing: The Universal Elixir and Other Computing Projects Which Failed, Tales of Computing Folk: Hot Dogs and Mixed Nuts *and the* Power of Peonage, *all published by Computing Trends of Seattle. A more serious work, the* Software Reliability Guidebook, *will be published by Prentice-Hall in mid-1979.*

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'Improvement' No Answer

(Continued from Page 33)

It seems that the IRS would have put out a press release if it had been able to explain all this, but canceled the idea when it was unable to write one that made sense. Anyone found using Table 8 for weekly periods (or other periods for which the IRS publishes tables) is warned that the IRS does not consider it legal to do so.

Beware of Underdeducting

Anyone who underdeducts is warned that employers can be fined to make up the difference.

If you want the IRS to change the system for next year, write to the director and state your reasons. But take into account that although the IRS proposed the calculation change (and failed to announce it), the Treasury Tax Policy Committee and the Joint Congressional Committee on Taxes, which accepted the change, are really responsible. If you think you are being given the runaround, join the crowd.

To Avoid 'Nontechnical' Stigma

DP World Needs Systems Audit Definition

Reader Commentary

By Michael Bingle
Special to CW

I think Howard A. Karten had the right idea in "Most Systems Auditors Not Experts in DP" [CW, Jan. 15].

In my installation, we have seven systems auditors and one systems audit manager. The manager has a very impressive background in DP, having been an applications programmer, an analyst and a systems programmer. He has also been in the auditing field for a number of years.

Three of us have "worked our way up" in DP. We've had experience in the operations, programming and audit departments. The rest are recent college graduates with Computer Science degrees, but little experience in the field.

'Nontechnical' Sitgma

If you are familiar with systems audit, I think you would agree this mix is rare. Usually, you will find accountants and internal auditors trying to perform the duties of the systems auditor. This is why the group as a whole is being stigmatized with the term "nontechnical."

Perhaps when the systems auditor's job is defined, and the definition is accepted, the systems audit groups in all installations will lean toward the technical, not the accounting end.

The techniques for auditing automated financial systems are much different than those for auditing manual systems. In fact, I will go so far as to say that if you do not have a good knowledge of DP, you could not possibly perform the job of a systems auditor.

If your systems audit section is training accountants and internal auditors as systems auditors, it could cause the following problems:

- The inability to clearly understand the computer system and application systems.
- Improper setup of DP guidelines and procedures.
- Ability to code only minor programs using report generating languages instead of programming proper systems audit software, which would ensure the integrity of the system(s) belonging to your installation.
- Ineffective communication with sections of the DP environment.
- The inability to review software packages purchased by your installation.
- Inadequate control of information and funds going through your computer systems.
- A data center that is not properly secured.

Proper Balance Needed

But this does not mean you should lean totally toward the technical end. Systems audit does have an accounting function — to ensure the proper control of the installation's computer systems. This means reviewing the system's accounting structure from the onset.

Being assigned to task force meetings which meet periodically is helpful in this phase of the systems design process. You should know basic accounting methods as do most systems analysts, but you must also know DP techniques to effectively suggest the best methods of control.

So I agree with Karten, and I do believe he speaks from experience. But the problem is the DP world needs a definition of the systems audit process. No one has, as yet, proposed a universal definition so each installation is implementing its own idea of systems audit.

The problem may be in the word "audit." If you mention "audit" to management, it immediately envisions "accounting," since most individuals in upper management have progressed through the finance and accounting departments.

Bingle is a senior systems technician in systems audit with Blue Cross/Blue Shield in Newark, N.J.

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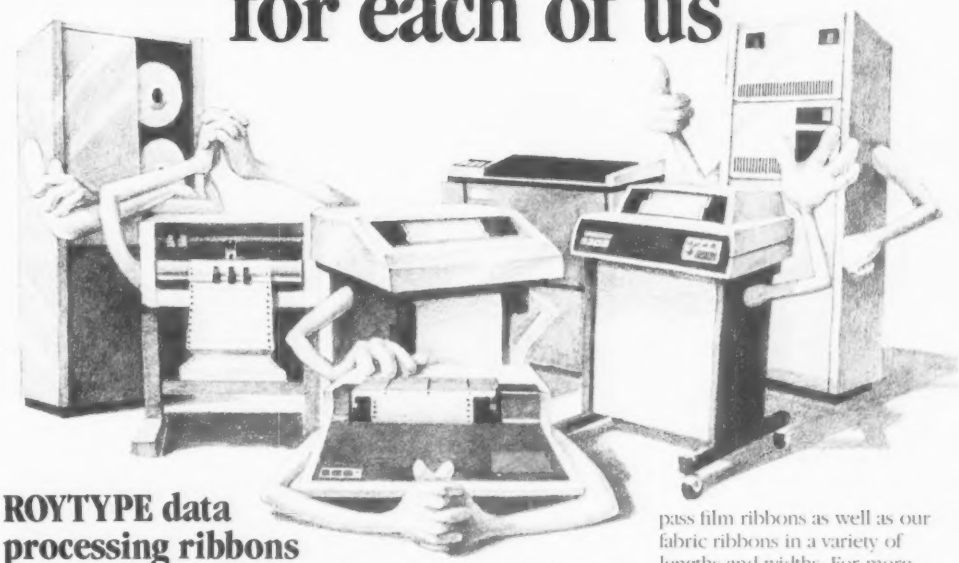

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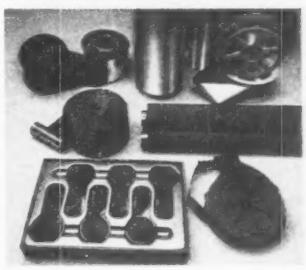

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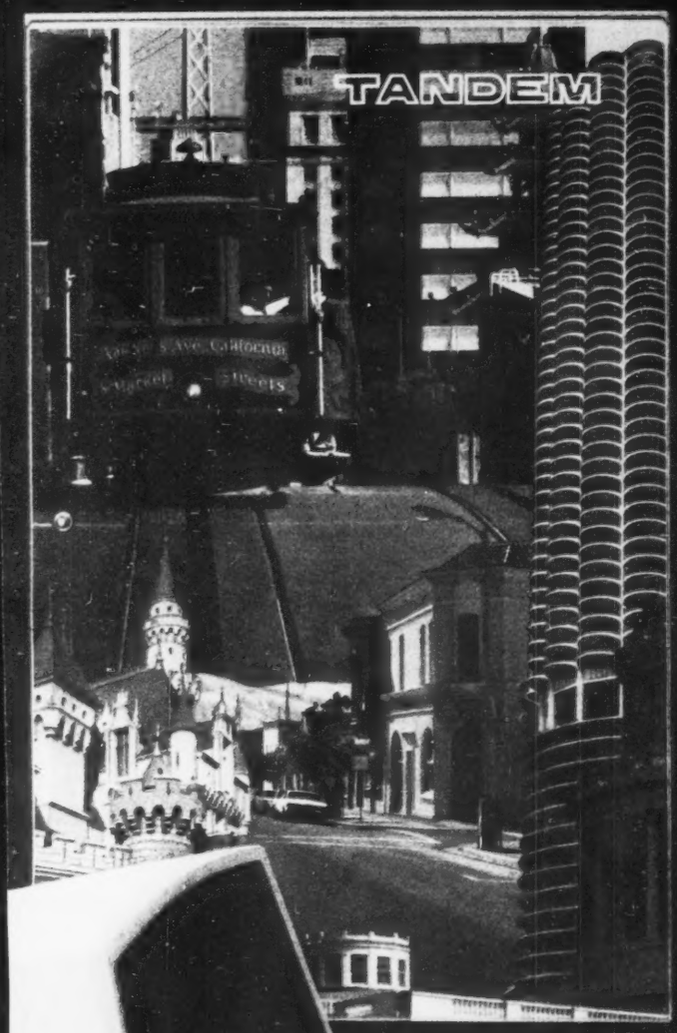
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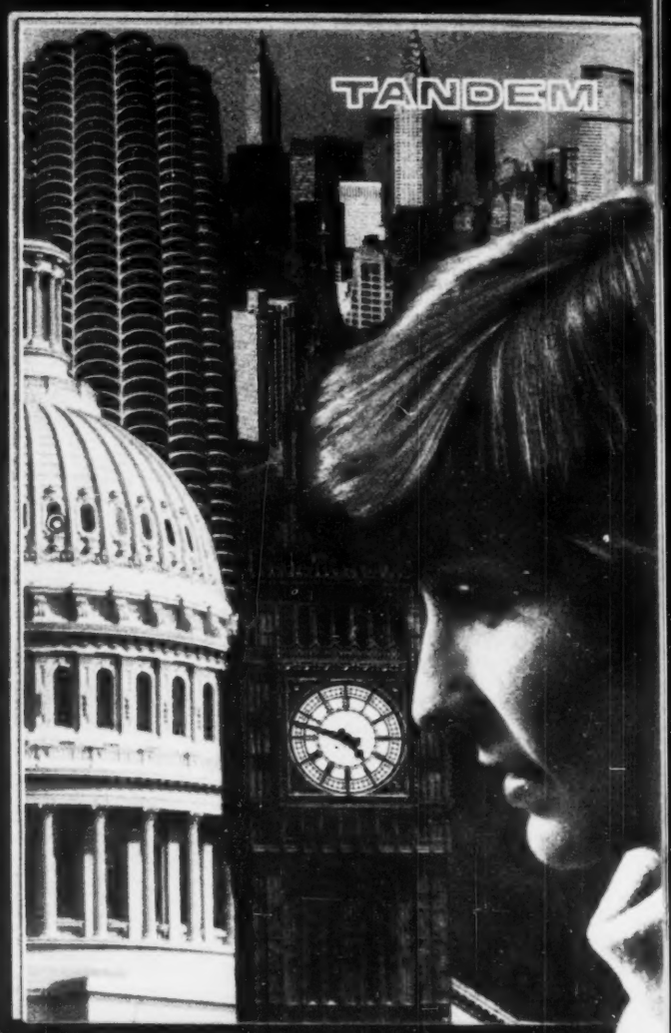
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Announcing the 4000 processor network.

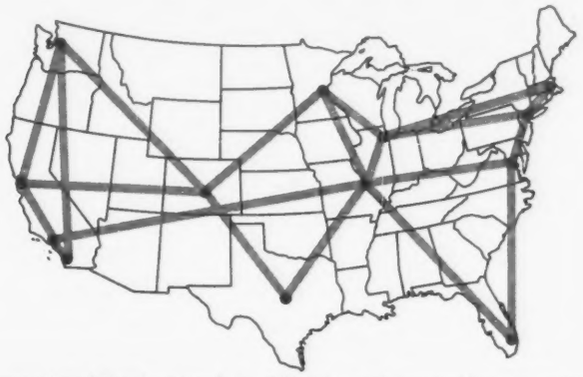
Here's how to tie together 4000 processors: Easy. Interconnected in the most beautifully simple way. Per the diagram. Point-to-point connections can be made between all centers of overlapping activities, but are not required. We can in fact tie the network together with a single continuous line. And there is no user involvement for pass-through. To get from "A" to "F," no user housekeeping penalties from "B," "C," "D," & "E." It looks exactly as if all messages were being transmitted only next door. And X25 protocol is available as well.

Introducing the distributed/ centralized data base.

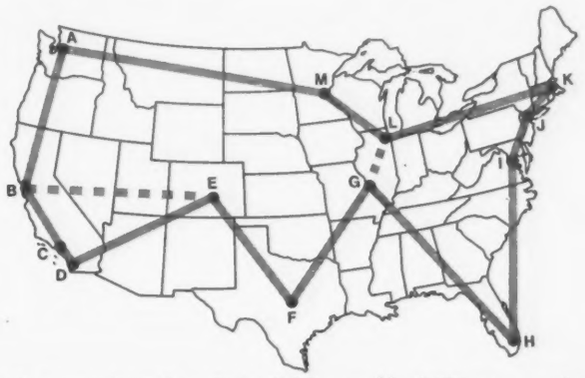
Totally transparent. With a split of geography completely invisible to the user. Not the separate interconnected data bases found in other networks but a unified data base completely and transparently accessible throughout the network. No user, and no application program, has or requires any awareness whatsoever as to the actual location of any segment of the data base in the Tandem network. With a Tandem NonStop Computer System, your data may be in Ypsilanti, but it looks for all the world like it's residing right in your own local system.

To get rid of a host of problems, get rid of the host.

Having a host system in a network is traditional. Unfortunately, it is also the traditional point of concentrated difficulties. For when the host goes down, so does the whole network. And even if the host is only suffering an intermittent difficulty, the integrity of the data base is up for grabs, not only in the host, but throughout the remote data bases as well. With Tandem's GUARDIAN/EXPAND Network, a local failure has no impact whatsoever on the rest of the



Conventional fixed network is difficult and expensive to expand and modify as needs grow. And they always do. Communication and utilization of data base records from twice removed nodes is prohibitively expensive in applications programming, so more lines are the only viable solution. And that is expensive, too.



Tandem pass-through packet switching enables "A" to communicate with "E" at no penalty in system overhead. And you can add direct lines, per "B" to "E" or "L" to "G" whenever traffic warrants without disrupting system performance or efficiency. Note that nodes can be of variable sizes, all using Tandem NonStop Systems as the common element. Efficient, powerful and extremely low cost.

system, and best-route switching automatically circumvents the trouble spot. If there is a failure in the communication link, the system will automatically go around it. The system and the network stay up and running, and best of all—the data is intact, its integrity assured.

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The long and the short of it—keeping costs down and performance up.

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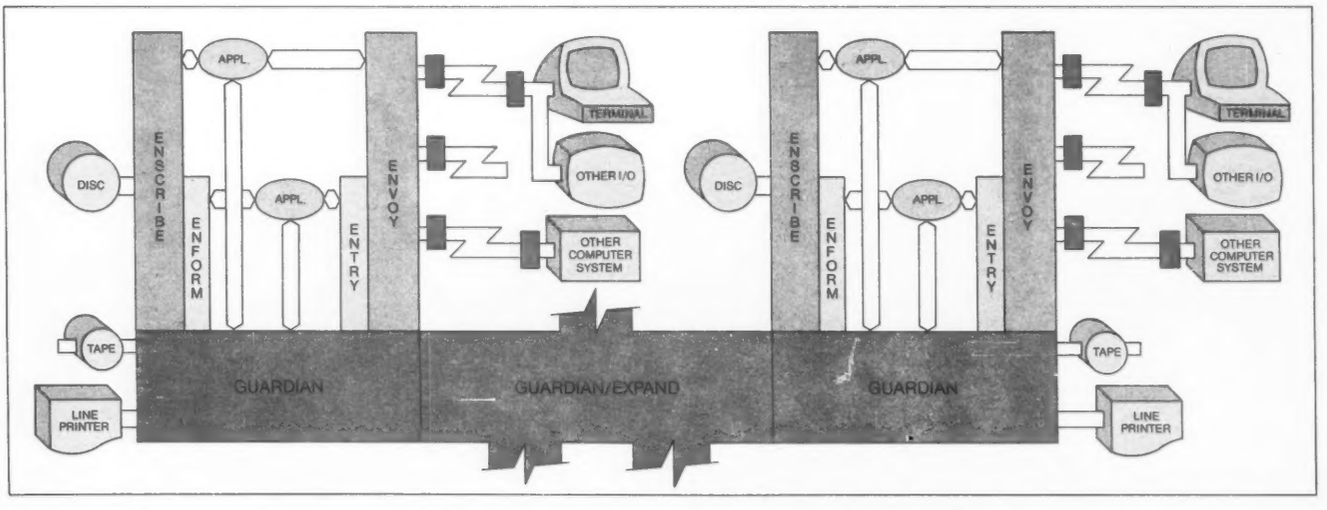

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Xerox Users Told How

Printer Generates Performance Graphics

By Don Leavitt
CW Staff

LOS ANGELES — Most summaries of system load and activity or reponse to that load are hard to interpret "and even more difficult to correlate with other pertinent data," according to technical specialist Tom Lehman of Montana State University (MSU) at Bozeman, Mont.

But analysts must have documentation they can use, and that is why the university developed a program it calls the Computer Load Analysis and Response Interpreter for Throughput Improvement (Clariti), which produces an easily comprehensible, line printer-based display, he told the recent Exchange conference here.

Like the other installations attending the user group meeting, MSU has Xerox computing equipment now supported by Honeywell, Inc. The concepts built into Clariti, however, should be useful for any installation with access to a printer that permits overstriking to produce distinctive shading.

The university has been pleased enough with Clariti that it is "certainly willing" to share the software with others who can use it, Lehman said.

One-Page Printout

The system printout is confined to one sheet for each day, but the trio of reports on that date show both tabularly and visually such major factors as on-line and batch workload and activity over time in each of the partitions that run on the university's Sigma 7 CPU.

The upper third of the Clariti summary is the Partition Spread display on which batch activity is depicted in three dimensions, according to Lehman. The horizontal axis is a time line, representing each of the days of the week from 6 a.m. to 6 p.m. in 15-minute intervals.

The vertical axis shows the batch partitions, one through 16, and the third dimension is the activity at each time interval for each partition, with the degree of activity represented by the shade printed at the corresponding location.

The shade, produced by appropriate overprinting, represents the number of minutes during the time interval the partition was active. The darker the shade, the more active the partition, Lehman noted.

To the right of the display, as a quantitative measure of the overall load for each partition, the total number of batch jobs as well as the percentage of total possible activity is printed.

The lower third of the Clariti output is the system load display for the week, depicting the number of on-line and batch users superimposed on a shaded bar chart. Sixteen levels of usage are shown in the vertical axis, with 15-minute time intervals again In minute segments.

Typically the time intervals show a series of Xs, representing the on-line users with the lesser number of batch users superimposed, again by overprinting, at the base of each time slot. In cases when there are more batch than on-line users, a different pattern of overprinting is used, Lehman pointed out.

Supporting data is provided in tabular form along the bottom and to the right of this report, he added.

Kiviat Graphs Modified

The midsection of the Clariti report shows an MSU variation of Kiviat graphs, modified to accommodate the line printer as the generating tool and the measurements the university feels are important to its operations. There are, in fact, three graphs on each report; one illustrates the average figures for one hour in the morning, another in the afternoon and a third in the evening.

Although MSU has disregarded the general Kiviat graph guidelines of alternating "good" and "bad" measures, Lehman showed that what the university has done makes sense for it. The measures above the midpoint of the graphs, for example, show active time while those below are inactive.

Further, the measures on the right side of each graph are batch-related while those on the left are more closely tied to on-line work, he explained. Thus the meaning of any imbalance in a graph can immediately be sensed even by those who don't completely understand the measures themselves, Lehman noted in conclusion.

'Faqs' Update Backs PF Keys

COLUMBUS, Ohio — Version 4 of the Fast Queuing System (Faqs), a DOS/VS performance enhancement package from Goal Systems Corp., includes support for the use of program function (PF) keys, extended support for console spooling and continued backing for partition balancing.

The Faqs update offers greater control over the spooling facility, a spokesman said.

Version 4 has a control feature, for example, that allows the user to suppress the end-of-job console printout unless it is requested in the jobstream or the job terminates abnormally.

A user exit is also provided to enable users to define their own criteria for the console summary report, he said.

The console spooling hardcopy support has been upgraded: Faqs now uses the IBM Display Operator Console (DOC) hardcopy file for systems running in DOC mode and provides a hardcopy spool file similar to the DOC file for those sites not running under DOC, the spokesman continued.

Program function (PF) key support allows users to assign constant values to each PF key on a DOC console or to simulate the use of PF keys — if the system console doesn't have them — by designating any special character to represent a PF key.

The partition-balancing facility from previous versions has been continued in Version 4. Under this feature, the software reassigns the dispatching priorities of a user-specified set of partitions if that becomes necessary to improve system performance and reduce processing bottlenecks.

Faqs can be leased for $50/mo, $540/year or $1,620 for a fixed-term lease.

Goal Systems can be reached through P.O. Box 29481, Columbus, Ohio 43229.

NCR Extends Support for I-8100s

DAYTON, Ohio — NCR Corp. has introduced software that extends the capabilities of its entry-level I-8100 family of interactive computer systems.

Some of the software permits the systems to be used as satellites of larger CPUs or other I-8100 systems at remote sites, NCR said. Other programs enable I-8100s to use Basic.

The vendor's Remote Batch Subsystem can help I-8100 users distribute processing power where it is most needed, a spokesman claimed.

"For example, an I-8100 at the divisional level can be used for local processing tasks and also to generate summary information that can be sent to a central computer at a higher level within the organization," he explained.

Such a system can use either a dedicated line or a switched network in transmitting data from one site to another, NCR stated. The system reportedly communicates at speeds up to 9,600 bit/-sec in binary synchronous mode and can be linked with most NCR and non-NCR CPUs.

The Remote Batch Subsystem software entails a monthly license fee of $25.

NCR's Basic — which can process the same data files used or created in Cobol programs — carries a monthly license fee of $25 for the I-8150 and $15 for the I-8130. Under a one-time payment plan, Basic costs $500 and $840 for the I-8130 and I-8150, respectively.

Software Directory Reorganized

INDIANAPOLIS — The *ICP Software Directory*, published by International Computer Programs, Inc. (ICP) and containing more than 5,500 software product descriptions, has been expanded into five volumes, each published twice a year.

The growth from the previous three-volume format will make it easier for potential software purchasers to locate information related to specific products, an ICP spokesman said. Additionally, users should find it simpler to identify which volumes are pertinent to their needs.

Under the current plan, *Data Processing Management*, containing information on systems and utility software now available, will be published in January and July each year.

The *Business Management* volume that formerly accompanied *Data Processing Management* has been divided and set on a different schedule. A volume on *Cross-Industry Applications* that lists products having general applicability to many business disciplines — payroll or general ledger, for example — will be updated and released in February and August.

Industry-Specific Applications, carrying products and services designed and supported for particular portions of the computer community, will be published in March and September.

The *Mini-Small Business Systems* book has likewise been split, with cross-industry software listed in a book published in April and October and industry-specific products cataloged in a volume released in May and November.

All volumes are available through yearly subscriptions that entitle the subscriber to the most recently published volume of his choice and the next update. The annual fee is $65; a 20% discount is available on orders for more than one volume. ICP is at 9000 Keystone Crossing, Indianapolis, Ind. 46240.

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CICS/VS Application Programming (Command Level)
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June 4-8 Chicago

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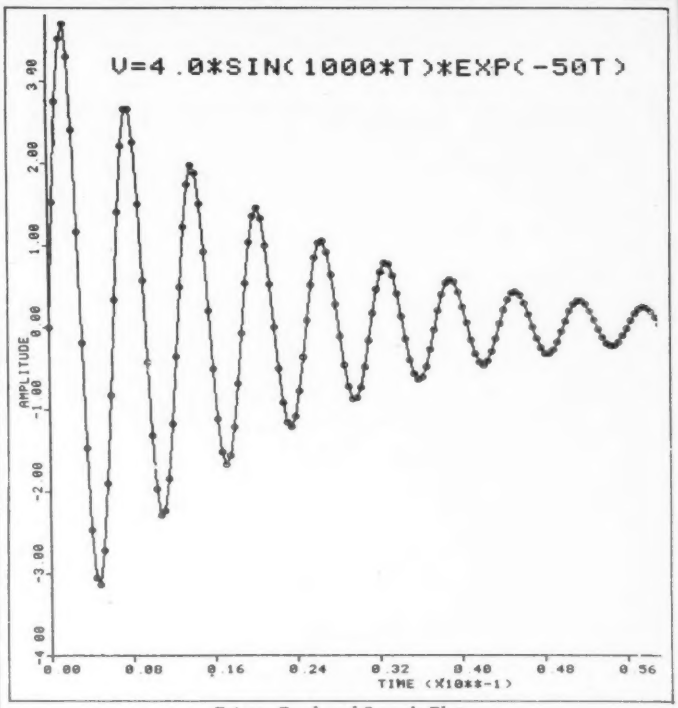


Printer-Produced Sample Plot

Package-Prodded Printer Produces Plentiful Plots

COLUMBIA, Md. — An industry-compatible plotting package designed to use a Printronix, Inc. printer instead of a plotter as an output device is now available from Rhintek, Inc. Written in Fortran, it runs under Data General Corp.'s RDOS or Digital Equipment's RT-11 operating systems without modification, according to a spokesman.

The package replaces "Calcomptype" — California Computer Products, Inc. — routines, producing the same plot "usually in a fraction of the time," he said. Resolution of the printer-based plot, 60 by 72 point/in., is sufficient for most engineering or in-house requirements and provides a quick-look means of proofing pen plotter graphs, he added.

Routines supported by the package include Line, which draws a line through a series of X/Y points; Axis, which draws an annotated X or Y axis including a title; Symbol, which plots any size character on the paper; and Number, which plots a real number with a specified format.

Two plot routines are provided for the user who does not need to control the details of the plot but would rather have a quick plot capability. The resulting plots are appropriately scaled and axes are annotated to produce a usable plot, the spokesman claimed.

In addition to RDOS and RT-11 versions, the package is also available in card image format.

The package is normally distributed on 9-track, 800 bit/in. magnetic tape for $950. It can be supplied on other media for an extra charge of $150 plus the cost of the media.

Rhintek can be contacted through P.O. Box 220, Columbia, Md. 21045.

Multikey Sort for PDP-11 Balances Disk Space Used

PENNINGTON, N.J. — Speedsort/11 has been announced by Pennington Systems, Inc. (PSI) for Digital Equipment Corp. PDP-11 minicomputers running under RSX-11D, RSX-11M or IAS environments. It can be invoked as a user command or called from a Fortran program.

The utility can work with up to 15 sort keys, which may be in a number of data types. They may, for example, be integers (16- or 32-bit signed), floating-point (32- or 64-bit), character (8-bit unsigned) or word (16-bit unsigned), a spokesman said.

Speedsort/11 will sort any file type supported by DEC's File Control Services — fixed or variable records, spanned or unspanned blocks, he went on. Work space needed for the sort/merge can be directed to any disk device, minimizing arm contention and taking advantage of temporary space available on any device.

The program accepts two levels of command files, including partial commands such as the key specifications or the input file name.

A unique feature of the package is a high-speed record order "verify" mode in which the user specifies sort keys and Speedsort/11 reports whether all records in the file are already in order.

The Pennington utility is available for $600/year. The Fortran-callable option costs an additional $100/year.

A one-month trial copy in DOS/FLX format on 9-track, 800 bit/in. magnetic tape is available for $50, PSI added from Building A, 65 So. Main St., Pennington, N.J. 08534.

Improved Agreements Needed

Turnkey Success Hinges on Buyer-Seller Pact

By Leonard L. Hurst
Special to CW

The hardware-software cohesiveness of turnkey systems is a major force in motivating users to acquire such systems; but it is also the source of subsequent user dissatisfaction.

Much has been written about packaged software such as data base management systems (DBMS), sort/merge packages, operating systems and data communications packages, but less attention has been focused on those software routines that are part of turnkey systems.

Turnkey systems include not only the operating system and utilities, but most important, the "applications" software. While turnkey applications form the basis for user acquisition, other potential uses of the system soon become apparent and form the basis for system change. Software packages that have been successful thus far have provided the flexibility to allow a variety of users to adapt the same package, whereas the strategies and concepts of turnkey systems imply that the user must adapt to them. Potential benefits from turnkey systems may be achieved only if the buyer and seller understand each other's motives and requirements.

Minicomputers and microcomputers have paved the way for turnkey systems dedicated to the performance of functionally related specific tasks. These systems can be more easily specified and economically justified than more comprehensive, integrated systems. But as more opportunities for turnkey system development and marketing have unfolded, several major problems have surfaced.

The initial problem for the user is identifying a firm with the turnkey system that matches his requirements. In many cases, the user is not prepared to launch this search, since his requirements are neither clearly defined nor well-documented and he does not know what firms have systems with the potential for solving his problems.

Vendors are only too eager to convince the unprepared user of their system's merits, so the user's negotiations tend to revolve around turnkey system features rather than user requirements. Even if the user has prepared specifications based upon his needs, the chances of finding a vendor that has a product that exactly matches those specifications are nil. Most often the vendor will agree to some modification to meet the user's unique specifications if the changes can be made easily within the construct of the package.

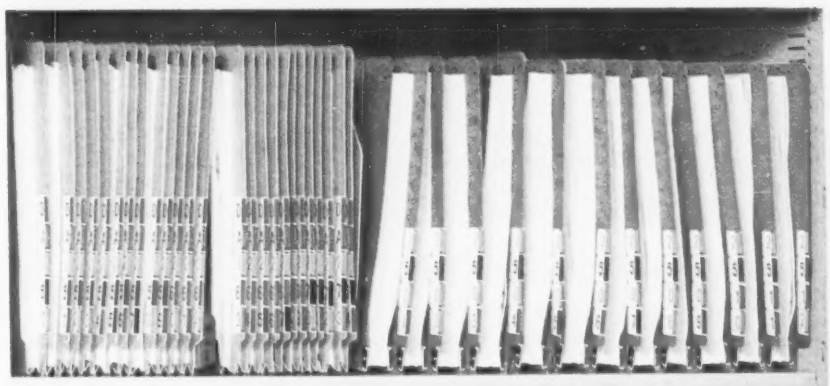
Once a package is purchased, as most turnkey systems are, the capital investment has been made. The user is then at the mercy of the vendor. The vendor controls system changes and the priority of those changes.

It soon becomes apparent to the user that while he has purchased a product with which he was initially satisfied, he may be unable to use that product efficiently or effectively in his own environment. As he becomes more familiar with the product, he is apt to identify opportunities to improve his use of the system in particular areas. At this stage, the user is starting to think of "software emancipation": getting control of the product for himself so he can change it to perform the way he wants.

Problems of software propriety and documentation become major concerns at this point. Most users are willing to pay the vendor a fair price to make changes, but some vendors may refuse to do so unless the changes clearly improve the system for their other clients. (Vendors do not want to support software mutations.) There have been cases where vendors have quoted exorbitant fees for modifications they didn't want to make.

Flexibility in system modification depends on the agreement between the user and the vendor, which typically involves the licensing of the

(Continued on Page 52)



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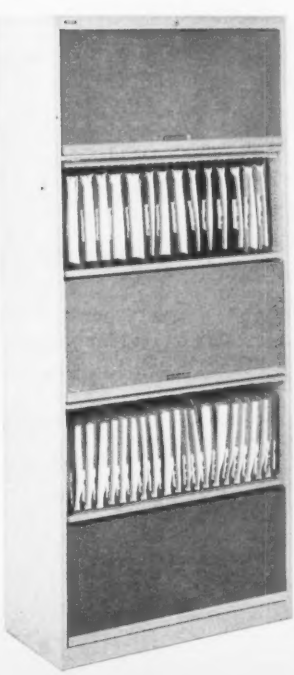

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How many strange "one-time" errors or anomalous results have actually been due to timing/integrity faults? There is probably no way of knowing for sure.

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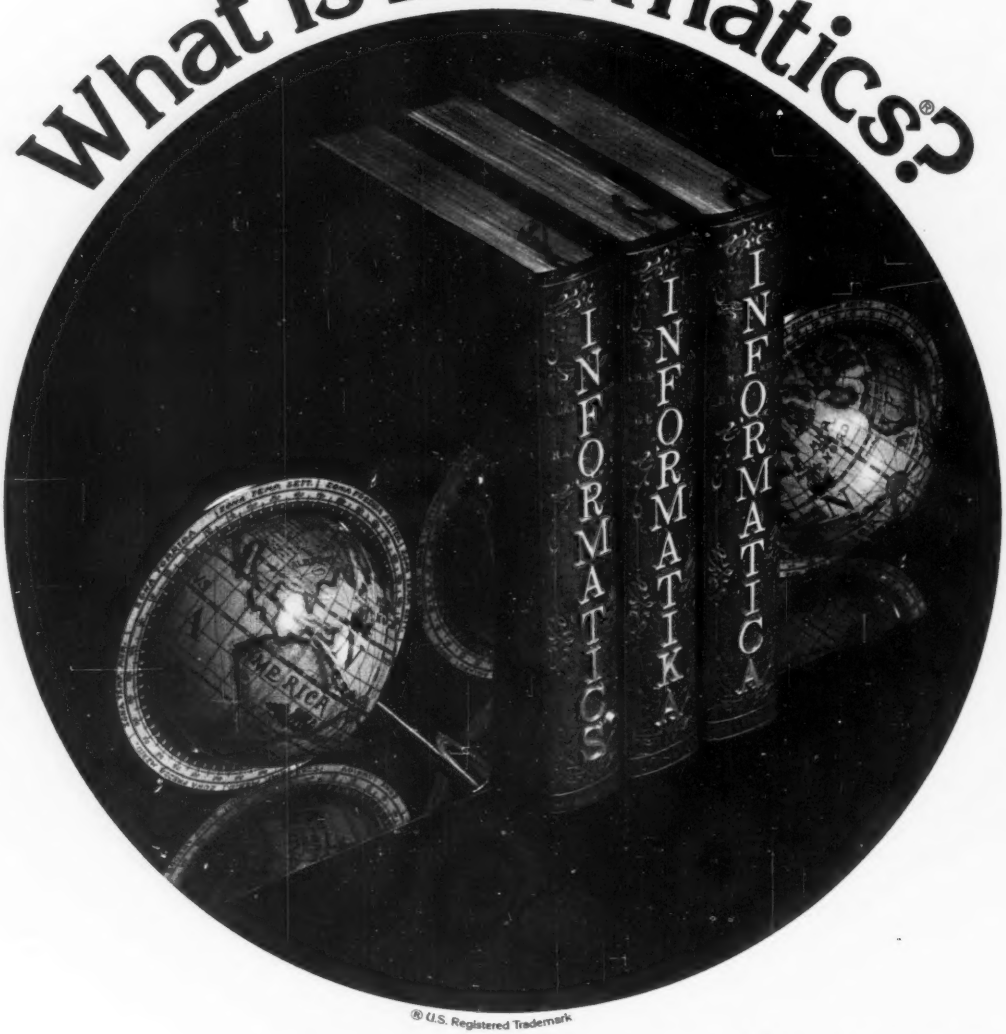

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HP 9845 Gets Statistical, Numerical Analysis Tools

PALO ALTO, Calif. — Three application packages that allow users to conduct statistical and numerical analysis programs on the HP 9845 desktop system are available from the Hewlett-Packard Co.

The Statistical Graphics package enables the system to convert numerical data into graphical plots that can be presented on the HP 9845's CRT or printer. A plot is one of the best means to visualize information much more effectively than extracting data from listings, a spokesman claimed.

A variety of different routines for entering, editing, transforming and otherwise manipulating data are available with the software, he said. There is also a choice of nine plotting routines, including time series, histogram, scattergram, semilog and log-log.

The General Statistics software is divided into five sections. Four contain statistical tests, including one-sample, two-sample, two-sample independent and multiple-sample. Each has several tests of the same hypothesis to allow the most accurate choice.

The fifth section contains the most commonly used statistical distributions, thereby eliminating the need to consult tables.

The Nonlinear Regression Analysis package enables the user to determine the best fitting curve for a set of data using combinations of algebraic or Boolean expressions involving one or more independent variables and as many as 10 parameters.

The software also includes a set of routines to analyze residuals to check the quality of curve fit. The technique used in these computations is Marquardt's method of estimating nonlinear parameters — an effective compromise between the Taylor Series method and the steepest descent method, according to the spokesman.

Each package costs $500, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

Series/1 Gains RPG-II Compiler

GREENVILLE, S.C. — A package that includes an RPG-II compiler, a runtime driver to execute the compiler output, a sort facility and the OCL coding to use the software on an IBM Series/1 minicomputer has been developed by Series One, Inc.

The compiler is essentially industry-compatible: it can accept RPG-II programs prepared for IBM's System/32, according to a spokesman. The compiler runs under any release of IBM's Realtime Programming System (RPS), one of the operating environments available to Series/1 users, he added.

The driver routines are needed only to fit the requirements of the object code from the compiler to the capabilities of RPS, the spokesman explained.

In contrast with the Basic Sort macros available from IBM, which still need user-written logic to meet specific needs, the sort facility is ready to use, according to Series One. The sort functions as a separate job step and OCL is provided.

The utility functions as either a tag sort, producing System/32-style ADROT output, or as a record sort, with the input file fully resequenced, the spokesman said.

As with most modern sorts, the Series One facility — including the choice of operation — is controlled by parameter entries, he added.

The package requires a 64K-byte Series/1 with disk or diskette units, a printer and an operator station. It is being made available to end users through a distributor network; although costs may vary from one location to another, the developer estimated the package would probably cost $4,000 to $5,000.

Series One is in Piedmont Center, 33 Villa Road, Greenville, S.C. 29606.

Mailings Backed on Micro

BROOKLYN, N.Y. — Microprocessors operating under CP/M and Cbasic can be used to run a name and address maintenance application called the Super-Sort Mail List and Lookup System (SMLS) from HSC Computer Services Ltd.

The package supports interactive entry of up to 10 fields on each record. In addition to name, company, street address, city and state, it includes a Zip Code field with room for 10 digits as well as a place for the addressee's phone number.

On the other end of the processing cycle, SMLS includes a sort facility that allows sorting on the first seven characters in any field, a spokesman noted, adding that this capability eliminates the need for a separate sort utility.

The software produces hard-copy mailing labels as well as CRT-based displays of the stored records and printed reports of the user's customer or membership file. Another of its features allows users to check for duplicate records in what the spokesman called a "spot check" mode.

SMLS requires a 48K-byte processor with two disk drives, a terminal and a printer.

At present it is available on North Star minifloppy diskette, but will soon be on 8-in. diskettes as well, he said.

The package costs $125 and can be ordered through P.O. Box 43, Brooklyn, N.Y. 11236.

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Intel Enhances Fortran-80

SANTA CLARA, Calif. — Version 2.0 of Fortran-80, which exceeds the ANS Fortran 77 language subset specifications, has been enhanced, particularly in the areas of I/O interfacing and hardware floating-point support, according to the vendor, Intel Corp.

Support for character variables adds to the language's I/O data handling capability and reduces the programming needed to achieve given results, a spokesman said. Other additions to I/O handling capability include list-directed processing — the ability to read or write without a FORMAT statement.

For floating-point calculations, Intel microprocessor users can "easily use" the vendor's ISBS-310 high-speed mathematics board or the software routines built into Fortran-80, the spokesman continued.

The hardware-based floating-point support is faster than the software choice and presumably leaves more room in storage for the user's program logic.

Fortran-80, Version 2.0 is now available from Intel on single- or double-density floppy diskettes for $1,750. Intel is headquartered at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Turnkey Success Tied To Buyer-Seller Pact

(Continued from Page 47)

software over a finite time period and a software maintenance agreement that pays for correcting problems and adding enhancements.

What are the user options when urgent requirements for system change cannot be satisfied? Does he own what he thought he bought? Does he understand the product he has to the point where he can modify it? What part is proprietary and what part is not?

These are perplexing questions, particularly to the user who decides to go the turnkey route and reap the potential benefits of lower cost and quicker solutions to his problems rather than to develop the product internally or through contract.

Several Principles

The potential buyer should know a number of principles about turnkeys:

- The smaller the package — that is, explicit specifications with precise boundaries — the easier it is to satisfy requirements.
- The more the package directly impacts the end user, the more difficult it is to satisfy the requirements.
- The more direct interfaces with the end user (man-machine dialogue), the more difficult it is to satisfy requirements.

The environment also plays an important part in the success of the product. When a turnkey system is implemented in an environment that has had strong internal DP support in the past, delays in error corrections and system enchancements are magnified. If implemented in an environment where internal DP support has been weak, chances of acceptance are improved. Where no other DP support exists, the turnkey system has the best chance of success.

For the concept of turnkey systems to succeed, the vendor must be prepared to solve the user's unique requirements at a fair price. On the other hand, the user must be willing to use the system as it is delivered for a period of time before bombarding the vendor with change requests.

Turnkey system contracts must be improved to provide both parties with a clear understanding of the buyer's rights and the seller's obligations. Most contracts have been prepared by the seller and thus tend to dwell more on the seller's rights and the buyer's obligations. Model turnkey systems contracts or agreements that protect the rights of both parties need to be written.

If these issues are not resolved, user disillusionment with turnkey systems may retard the technical advances in package and turnkey system development that are urgently required to satisfy users who need application systems quickly and at a fair price.

Hurst is a DP professional who holds a Certificate in Data Processing and lives in La Jolla, Calif.

"The choice was obvious... FORTEX! Their A/R system provided features beyond our planning and expectations."

Albert W. Paul
Data Processing Manager
Minolta Corporation
Ramsey, New Jersey

"Minolta's accelerated growth rate had rapidly outmoded our semi-automated A/R system. A limited staff dictated finding a proven, operating package that would fulfill our needs and offer expansion capability. We limited our study to those systems with on-line capabilities, written in COBOL and using the DOS operating system. At this point, Data Processing and the Credit Department investigated the operational and functional characteristics of the remaining systems. The choice was obvious.

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Mr. Paul's analysis of our credit and A/R system more than justifies our dedication to enhancement development.

If you're a FORTEX software system user, you can be assured of having the most up-to-date operable system available in the marketplace. You can be further assured that continued enhancements will be made available to you as they are developed.

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And from a strictly functional standpoint, we continually strive to make operational improvements that translate into customer benefits. For instance, the next release of C-ARMS features an auto cash module which executes seven times faster than the current module.

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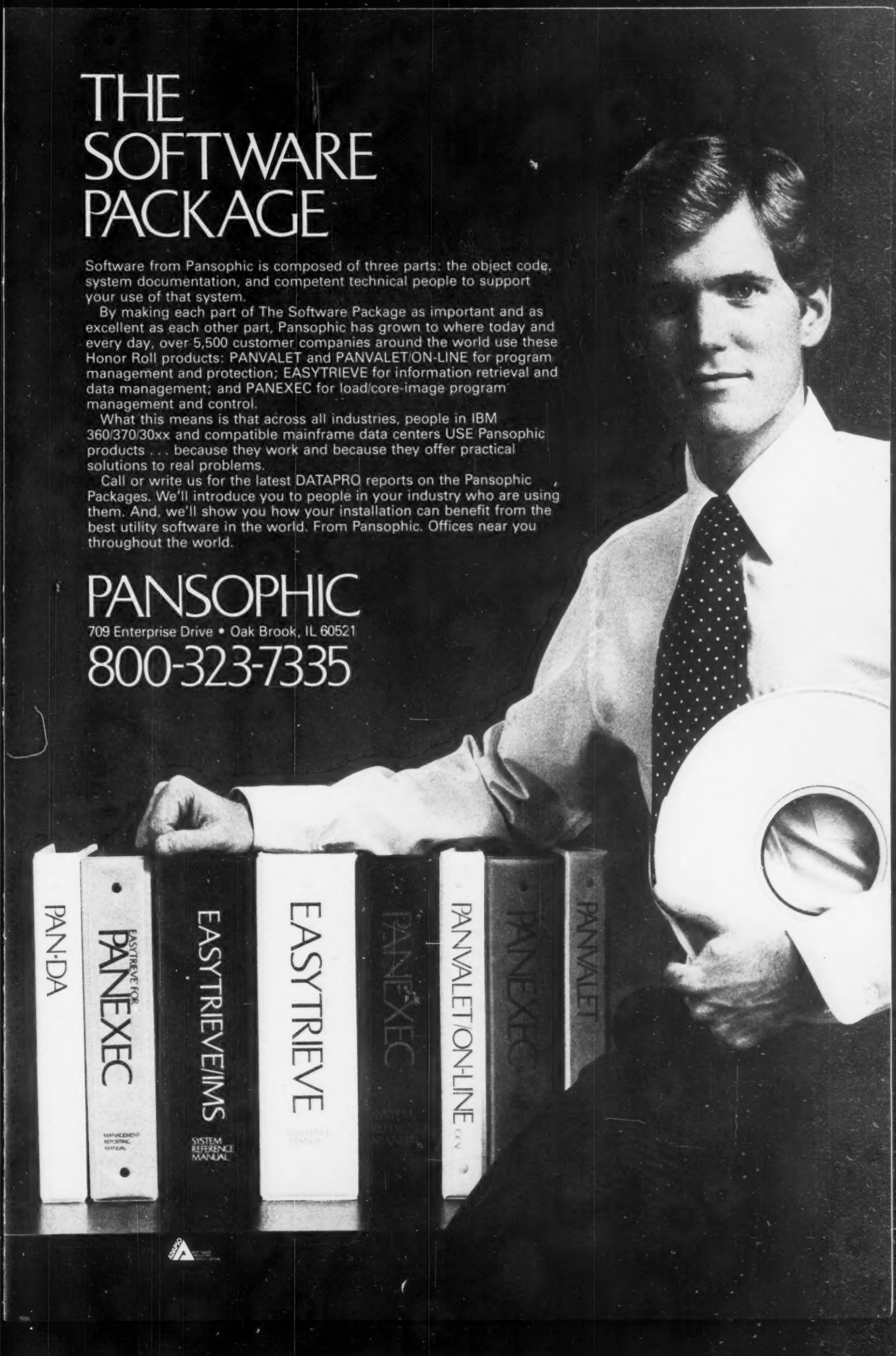

'Mars' Aids Management

N. PLAINFIELD, N.J. — Described as fully integrated, the Management Accounting and Reporting System (Mars) is now available from RAI Business Systems, Inc. for use on Datapoint Corp. processors.

The package includes modules to support accounts payable, accounts receivable, general ledger, payroll, order entry, invoicing, statements, sales statistics, inventory and purchasing, a spokesman reported.

Mars offers the flexibility required to handle all accounting procedures, yet it retains an ease of operation that makes it suitable for use by nontechnical managers, he claimed. All subsystems post to the general ledger automatically, he added.

The system uses English-oriented commands and tutorial prompting in continuous interaction with the operator. It signals immediately if a procedural error is made by the operator.

The entire Mars program can be learned by nontechnical personnel in "a day or so," the spokesman said.

The complete Mars package can be acquired for $10,000 plus $1,000 installation. Separate packages for payroll, general ledger, accounts receivable and accounts payable can be bought, without installation help, for $920 each.

RAI Business Systems is at 130 U.S. Highway 22, N. Plainfield, N.J. 07060.

CRT-Based Project Control Has Printed Output Option

IRVINE, Calif. — The Readinet project control system from Educational Data Systems, Inc. combines interactive computing techniques with classical Pert/Critical Path Method (CPM) time, cost and resource calculations and is ideal for construction and large manufacturing projects, a spokesman said.

The blend of capabilities results in an instantly usable, conversational system with all interaction through a CRT terminal but printed reports and analyses available on command, he explained.

Readinet can process projects with the number of activities and events limited only by available disk capacity.

Five-, six- or seven-day weeks can be selected at runtime, allowing the project manager to experiment with the effect of changing work weeks.

An unlimited number of holidays may be specified. In addition, multiple starts and finishes are allowed and scheduled dates can be assigned to any event in the network.

Ending events can be allowed to "float," representing the most critical situation, he added.

Up to 16 different resource types can be associated with each activity, and each resource type can have its own unit cost.

Nine standard reports are provided, but users can select a number of ad hoc reports as well.

Readinet is written in Business Basic under the Iris operating system. Multiple projects can be processed simultaneously from different terminals.

The basic Readinet costs $2,900. Additional information is available from the vendor at 1682 Langley Ave., Irvine, Calif. 92714.

Want to develop new systems in 1/5 the time?

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- *Provide your company with a software capability that delivers answers within the timeframe needed to make today's decisions today?*

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At the same time RAMIS II provides significant, quantifiable cost benefits to an organization, it also offers DP and MIS departments a significant intangible benefit—By removing much of the detailed coding function, RAMIS II provides an atmosphere where the best people can do their best work.

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9:00 a.m.

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I-684 & Route 22
Tuesday, March 20, 9:00 a.m.

SAN FRANCISCO
Hyatt on
Union Square
345 Stockton St.
Wednesday,
February 14
1:00 p.m.

PHILADELPHIA
Hilton Hotel of Philadelphia
Civic Center Blvd. at 34th St.
Thursday, March 8, 1:00 p.m.

PHOENIX
Hyatt Regency
122 N. Second St.
Wednesday,
March 7
1:00 p.m.

DALLAS
Fairmont Hotel
Ross and Akard
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SACRAMENTO
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DBMS Courses Planned by PDC

PRINCETON, N.J. — Performance Development Corp. (PDC), an independent consulting firm in the data base field, has announced three separate seminars it will present in the next six months.

"Data Base Trends for Decision Makers" has been scheduled for April 30 in New York City, May 21 in Houston and June 25 in Chicago. This one-day panel presentation will examine past failures of DP and trends in the technology that may correct them, a spokesman said.

Oriented to a specific data base management system, "The IMS Data Base Concept for the Organizational Community" is a three-day introduction to IBM's software. It will be given May 7-9 in Los Angeles, June 11-13 in Washington, D.C., and July 9-11 in Denver.

A two-day overview of effective practices and procedures in data administration and of the use of data dictionary packages to control and document the corporate data resource, the "Data Administration/Data Dictionary" seminar is scheduled for May 22-23 in Houston and June 26-27 in Chicago.

For enrollment or additional details, users can contact PDC at 1101 State Road, Building P, Princeton, N.J. 08540.

NTIS Book Outlines Pascal Use on 1100

SPRINGFIELD, Va. — A report describing an implementation of Pascal for Univac 1100 series mainframes was prepared late last spring by M.S. Ball at the Naval Ocean Systems Center, San Diego, and is now available from the National Technical Information Service (NTIS).

Cataloged as Document No. AD-A059 861/5WC, it is available in printed form for $4.50 and on microfiche for $3 from NTIS, 5285 Port Royal Road, Springfield, Va. 22161.

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Maestro is the most advanced solution to program development and maintenance available. In saving you time, it allows you to be more responsive in providing useful information to your users. And because it eliminates repetitive programming tasks, it can help you attract and keep your best programmers. So, with Itel's Maestro, every phase of your DP operations can give a winning performance, daily.

For more information, call Itel Corporation, Software Marketing at (800) 227-8427. Within California: (415) 494-3338.

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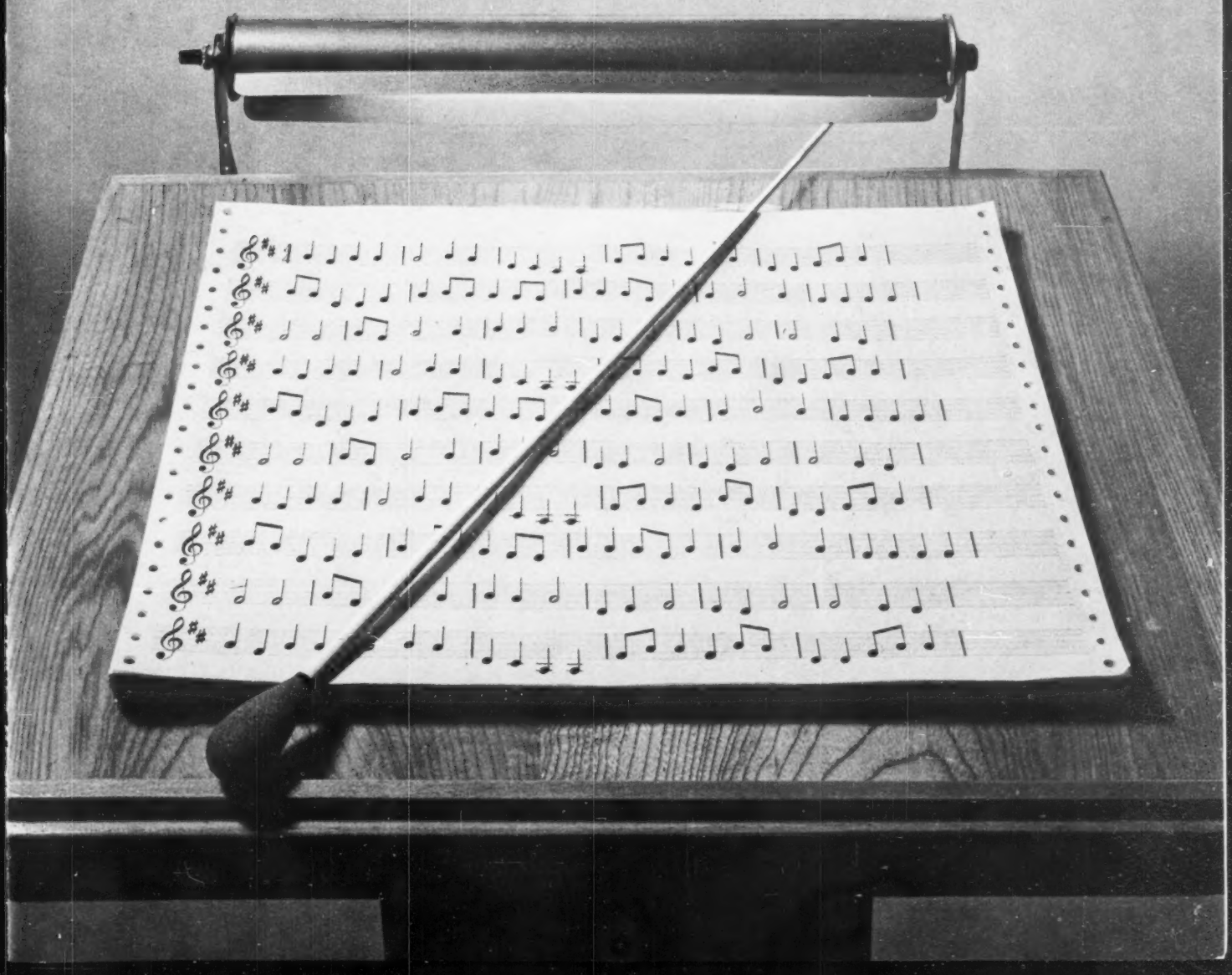
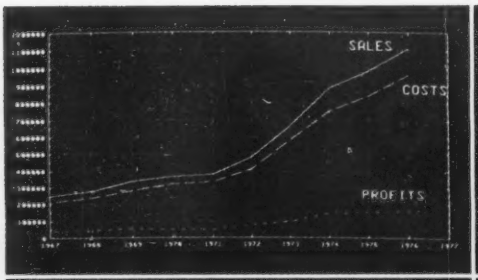
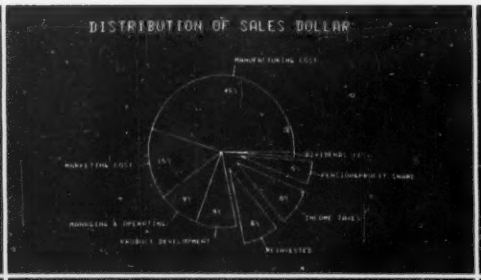
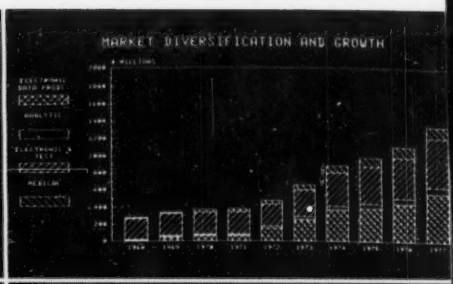
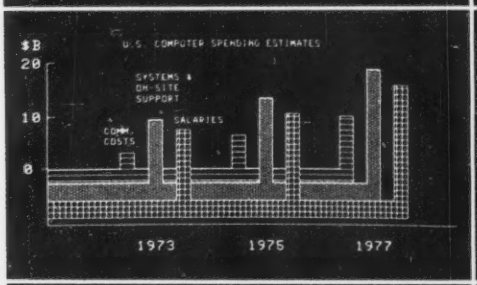


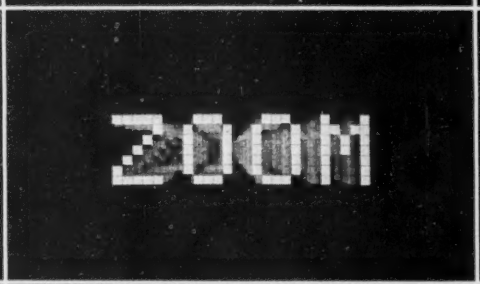
Graphics. Without

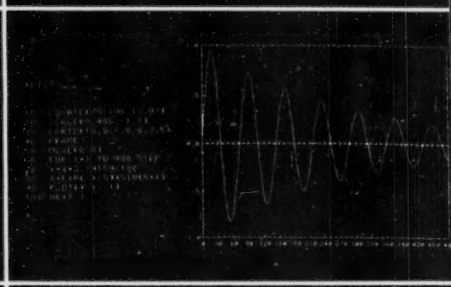


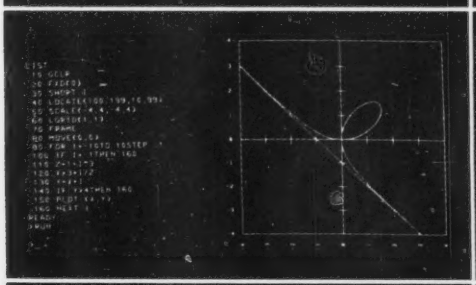


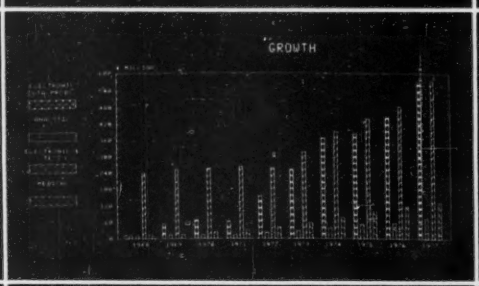


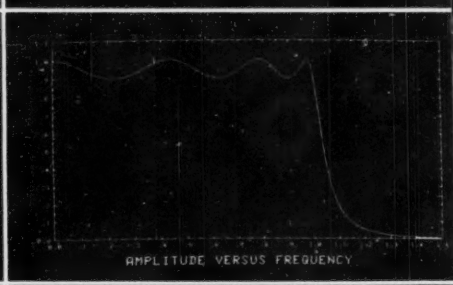


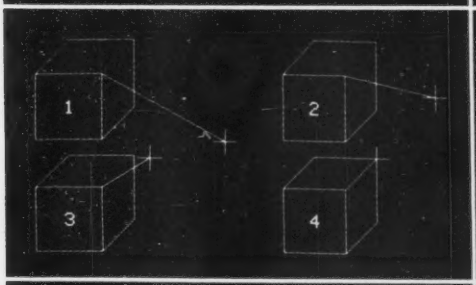


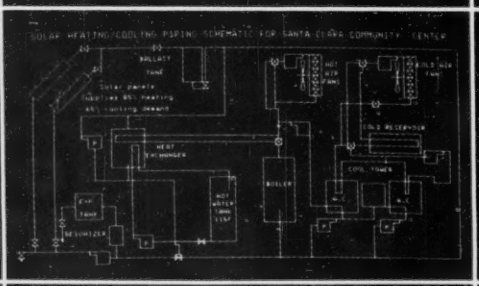


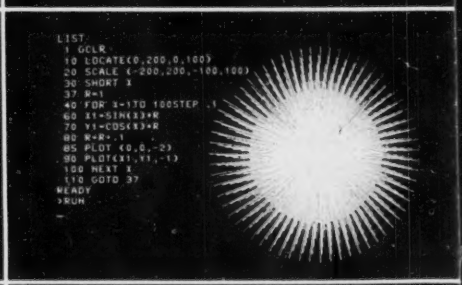


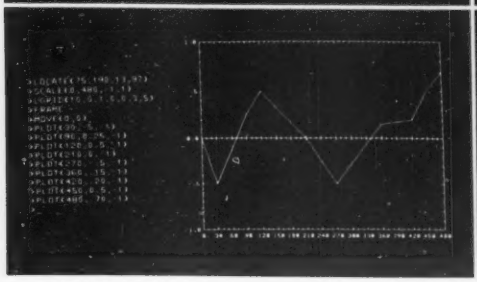


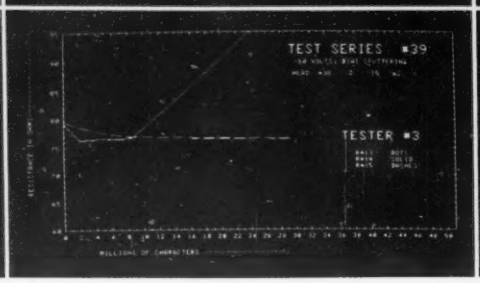


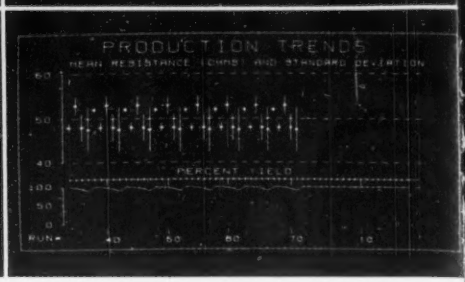












graphics software.

You just lost your last excuse for sticking with alphanumerics. Because with HP's new 2647A Intelligent Graphics Terminal, you get graphics without digging into your CPU's software.

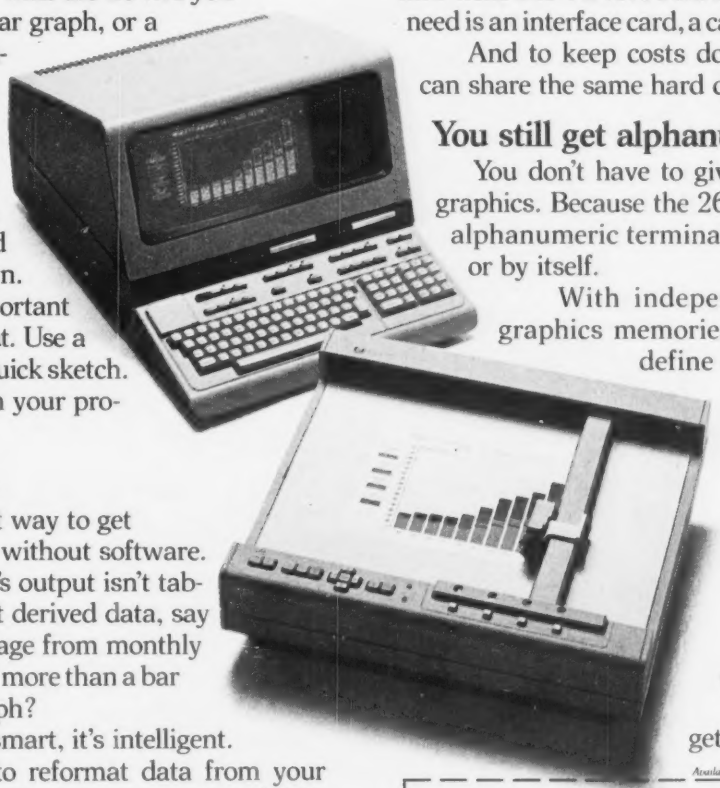
A picture's worth a thousand numbers.

On an alphanumeric terminal, your data's just a screen full of numbers. But with the 2647A you can plot tabular data as a bar graph, or a pie chart, or a linear or logarithmic line graph. Quickly, with just a few keystrokes.

Now you can really see your data, not just look at it.

What's more, with the 2647A you can zoom in and out. Pan right, left, up, down. Selectively erase. Shade important areas to make them stand out. Use a rubber-band line to make a quick sketch.

Without any help from your programming department.



It's more than smart.

The 2647A's the smart way to get graphics from tabular data without software.

But what if your CPU's output isn't tabular? Or if you'd like to plot derived data, say a three-month moving average from monthly sales figures? Or if you need more than a bar graph, pie chart or line graph?

The 2647A's not just smart, it's intelligent.

You can program it to reformat data from your CPU, or to compute more data, in easy-to-write BASIC. And you can program it in AGL, our high-level graphics language extension of BASIC. Its powerful commands, such as FRAME, AXES, LABEL, LOCATE and PLOT, put sophisticated graphics at your fingertips.

Either way, your program runs on the 2647A without any help from your CPU.

Hard copy's easy.

How do you get graphics into your briefcase?

The 2647A makes graphics as portable as alphanumerics. It interfaces easily with our 9872A Four-Color Plotter (which can even make overhead transparencies), and with our 7245A Thermal Plotter-Printer. All you need is an interface card, a cable and the peripheral itself.

And to keep costs down, more than one 2647A can share the same hard copy peripheral.

You still get alphanumerics.

You don't have to give up alphanumerics to get graphics. Because the 2647A's also a programmable alphanumeric terminal for interactive use on-line or by itself.

With independent alphanumeric and graphics memories. Eight soft keys you can define to do several steps with a single keystroke. A bright, easy-to-use, high resolution display. And built-in dual cartridge tape drives for 220K bytes of mass storage.

Best of all, the 2647A with full memory and data communications interface costs only $8300*

Which makes it easy to get the picture.

U.S. domestic list price

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'Training' Programmers

FREEPORT, Maine — A one-week seminar entitled "Assembly-Level Programming for the PDP-11" will be presented in San Jose, Calif., in late March and again in early May by Mini & Micro Educational Services.

Starting March 19 and then May 7, the seminar will use a model train controlled by a Digital Equipment Corp. PDP-11 to teach the steps in programming.

The programming projects start out very simply, a spokesman said, but end with the attendees writing interrupt-driven input/-output programs to control the train.

The student who completes the course will have written a program that makes the train go around the main track and another that makes it go around a certain number of times, specified by data from the keyboard. A third program should open a crossing gate, make the train go around once, switch the track and have the train continue on the inner tracks.

This is a novel approach, the spokesman admitted, but it serves to teach the PDP-11 instruction set, addressing modes and I/O programming.

The seminar costs $300, he said from Wardtown Road, Freeport, Maine 04032.

Royale System Backs Construction Firms

MILL VALLEY, Calif. — Designed for use on Microdata Corp. Royale minicomputers, the Construct package from Construction Information Systems, Inc. (CIS) is a series of integrated modules for project and financial management of construction companies.

Modules currently available support payroll, accounts receivable, general ledger, critical path method (CPM) scheduling and equipment management applications, according to a spokesman.

All modules are table-driven so the user can change management procedures from project to project or from company to company, he added.

The payroll subsystem calculates gross and net pay from salaried and hourly workers in multistate operations. In addition to interfacing with other modules, it also supports on-line inquiry against the employee master file, the spokesman noted.

The accounts receivable supports on-line entry of invoices, which includes interactive verification for vendor, general ledger and job-cost related details. It provides, under user control, at least seven methods of payment scheduling of unpaid invoices.

The network scheduling module uses the precedence method of defining the relationships between activities in a CPM/Pert-type network. This method eliminates the need for any "dummy" activities, CIS claimed.

Activities may be assigned to functional or administrative departments, and reports can be selectively produced by these departments, the spokesman added.

Although CIS is essentially a turnkey vendor, it will provide the Construct modules without hardware. Costs range from $5,000 for the job-costing routines to $2,000 for accounts receivable or general ledger.

CIS can be reached through P.O. Box 484, Mill Valley, Calif. 94941.

When you need color graphics, Ramtek has it all.

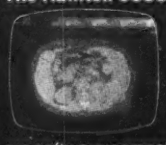
Color. A surprisingly powerful way to add information, manage it, increase the efficiency of its use. However you plan to use it, there is only one company with the breadth of line, the technological mastery, to give you the choices you need without compromise—or needless costs.

It's Ramtek. For color graphics. For imaging. Ramtek has what you need:

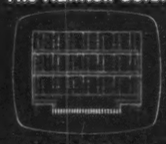
The Ramtek 3000. Eight models let you explore the possibilities of color graphics the moment you plug in your application software. Stand alone image processing and graphics. Fully integrated and ready to go. Desk configuration.

The Ramtek 9000 Series Display Controller. Four models. Total modularity. Buy just what you need; add to it at any time. The high-performance family. The industry standard in imaging and graphics raster scan color.

The Ramtek 9050 Series Display Controller. Four models. The most popular elements of the 9000 Series are here packaged for economy. All are software compatible with the 9000, have expandable memory and interactive capabilities.



The Ramtek Colorgraphics Computer Terminals. Three models let you choose between economy, optimum price-performance, or maximum resolution-performance. Easy to program. Easy to use. Easy to interface. Interfaces to the Xerox 6500 Color Graphic Printer for color hard copy output. These are the price, industry and performance leaders in raster scan color graphics terminals.



The Ramtek Monitor Family. Nine models. Up to 1024 line addressability on the screen in color or black and white. CRT sizes 13" or 19". Cabinet or rack mounted versions.

Ramtek Large Screen Projection. Interface Ramtek's or your own large screen projection unit easily, quickly.

And there's more to come. From Ramtek, the world's largest independent manufacturer of raster scan color graphics and imaging equipment. Direct sales in the U.S. and Canada. Distributors worldwide plus a worldwide network of customer service and depot repair stations.

For more information, write: Ramtek, 585 N. Mary Ave., Sunnyvale, CA 94086.

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RCC Adds N.Y. Center

NEW YORK — Remote Computing Corp. (RCC), a California-based computer services firm, has established a data center here, featuring a Burroughs Corp. B7700 system, and a marketing division to sell its capabilities.

The New York B7700 is "nearly identical" to the system RCC has at its Palo Alto, Calif., facilities. The Major Account Marketing Division hopes to be of service to large Burroughs sites, providing critical application backup and load leveling services.

The East Coast RCC center is on the 12th floor of the Home Insurance Building at 59 Maiden Lane in lower Manhattan. Corporate headquarters are at 1076 East Meadow Circle, Palo Alto, Calif. 94303.

Guidelines Offered for Preparing User Manual

By Richard Zaneski
Special to CW

Well-organized reference manuals provide an essential link between users and the technical staff of a computer facility. As a reference source, these manuals must contain sufficient detail to assist users in the performance of their job and answer any questions that might arise.

Past attempts at preparing user manuals were often futile. The end result was usually an overabundance of unorganized facts put together by systems development personnel. As such, the finished manual lacked organization, clear and concise writing, precise data, creativity, operational security or, in too many cases, a combination of these requirements.

To ensure that these points are incorporated in a user manual, a link must be established between the writer and user. A personality clash or disagreement in the initial phase of a manual's development creates problems.

If a good rapport is established, the writer will find it easier to produce a manual that is accurate and meets the user's criteria.

Basic Questions

In meeting with the user, the writer must determine the following information:

- What does the user need and how is it to be used?
- How does the user want the information organized?
- What group of people will work with the manual?
- Will any restrictions be placed on areas of information?

After answering these basic questions, the writer must develop a rough outline of the proposed manual. As a user document, every manual should contain certain general areas of information.

When the outline is approved, the manual can be written using system and program documentation as reference sources. In addition, meetings with systems, programming and user personnel should be scheduled to provide an in-depth picture of the system and its related work flow.

The writer should then view the system in a computer room environment to consolidate these areas of information.

Necessary Sections

In most cases, every reference manual should include the following basic areas. However, bear in mind that a user's needs dictate the contents of a manual.

- *Introduction:* This should be a detailed outline of how the manual is organized and what areas of information each chapter contains. In addition, a brief philosophy should be written explaining the purpose of the user document.
- *System overview:* This general system description outlines all basic functions. It must contain enough information to be understood by the user. This description can be supplemented with a system flowchart.
- *Input (forms, cards, etc.):* All input and how they are prepared — step-by-step — should be described. Throughout the explanation, the writer should use the imperative tense, gearing the instructions for those people who prepare the input. If forms are being used, their disposition once they are completed should be indicated.

A copy of each input form should be included, and it should be referenced in the narrative. If cards are used, every column of information should be explained with a table that shows column numbers, field names, field contents and user action related to those fields.

- *Output reports:* Writers should describe the purpose of all output reports, define each field and reference each defined field on the report example with a circled letter and arrow. These letters provide an important visual link between the report example and text. The written material will include the identifying letter, actual field name from the report and its definition.

Also, messages that might appear must be listed with their meaning and possible corrective action. In a separate section of the chapter, a table should list the distribution, retention period and disposition of all reports.

(Continued on Page 60)

Manual Writing Seminars' Focus

COLORADO SPRINGS, Colo. — One-day seminars on "DP User Documentation" will be presented by Progressive Communications, Inc. in San Francisco on Feb. 22 and a month later in Dallas on March 22.

The sessions will focus on how to write good user manuals. Emphasis will be placed on analysis of specific user needs, planning and outlining and effective writing, illustrating and packaging of documentation, a spokesman explained.

The program will include lectures on basic concepts followed by small group discussions to let registrants apply the ideas presented in the lectures to their individual needs, he continued.

The cost of the session, including materials and lunch, is $185 for individuals or $160/person for multiple enrollments from a single organization. Progressive Communications is in Suite 310, the Alamo, 128 S. Tejon St., Colorado Springs, Colo. 80903.

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Simulation Papers Sought

BOULDER, Colo. — A conference on simulation, measurement and modeling of computer systems will be held here in mid-August under the sponsorship of the National Bureau of Standards and two special interest groups of the Association for Computing Machinery.

Program chairman Gary J. Nutt of Xerox in Palo Alto, Calif. has issued a call for papers, noting that the conference provides a forum for both applied and theoretical work in the disciplines of performance monitoring, modeling and simulation.

Papers which duscuss work in at least two of those disciplines will receive special consideration, he said. Sample topics might include simulation and measurement during system design, design specification and analysis, workload derivation and use and software validation models and measures, Nutt added.

Requirements Deadlines

Papers should be 5,000 words or less and include an abstract of about 200 words. Accepted papers will be refereed and published in the conference proceedings.

Paper submission deadline is April 15. Notification of acceptance will be sent out by June 1 and final papers are due by July 1.

Four copies of manuscripts should be sent to Nutt, c/o Xerox PARC, 3333 Coyote Hill Road, Palo Alto, Calif.94304.

DP Consultants Cataloged

ST. LOUIS — Installation managers wondering where they can locate help outside their organizations may find the answer in the pages of the *National Directory of Computing and Consulting Services*, recently compiled and published by the Independent Computer Consultants Association (ICCA).

The directory lists more than 260 DP-related consultants and tells something about them, where they want to operate and any specialties they claim to have. The listings are organized primarily by specialty, but there are cross-references which may help in pin-pointing the geographic areas and — if appropriate — industry interests of each consultant.

ICCA encourages consultants to add their listings to the directory if they are not already in the 54-page book. There is no fee charged for listings, nor is the directory limited to ICCA members, a spokesman stressed.

Users can get the book for $10; discounts are available for multiple copies sent to a single address. The association said it is unable to bill for the directories, so payment must accompany orders.

All inquiries and orders should be addressed to ICCA, P.O. Box 27412, St. Louis, Mo. 63141.

Rules Simplify Manual Writing

(Continued from Page 59)

• *Code listings:* In a tabular format, all codes appearing on input forms and output reports should be listed as they appear in the text and referenced.

• *Glossary of terms:* All vague terms should be listed alphabetically with their definitions.

Additional chapters, *based on the user's needs*, could include the following:

• *Operational functions:* This would illustrate, in a procedural manner, the steps necessary to perform computer-related jobs. This chapter can supplement any procedural documentation that a user department might develop.

• *Job analysis:* This would analyze the programs of the system and show how they fit into the daily work stream. This chapter is geared more for the user who is technically oriented. It closely parallels existing program documentation.

However, certain limitations should be placed on this chapter based on the discretion of the DP manager and user department staff heads.

The program objective could be shown along with the frequency of use and the program's interrelationship with other programs and systems. Beyond that, operational input, the basic processing of data and files and output reports would be appropriate. Finally, error messages and special instructions could also be shown.

Final Steps

When writing the manual, the sections of each chapter should be numbered sequentially (2.1, 2.2, 2.3, etc.). In this case, the first digit identifies the chapter; the second digit is the section number.

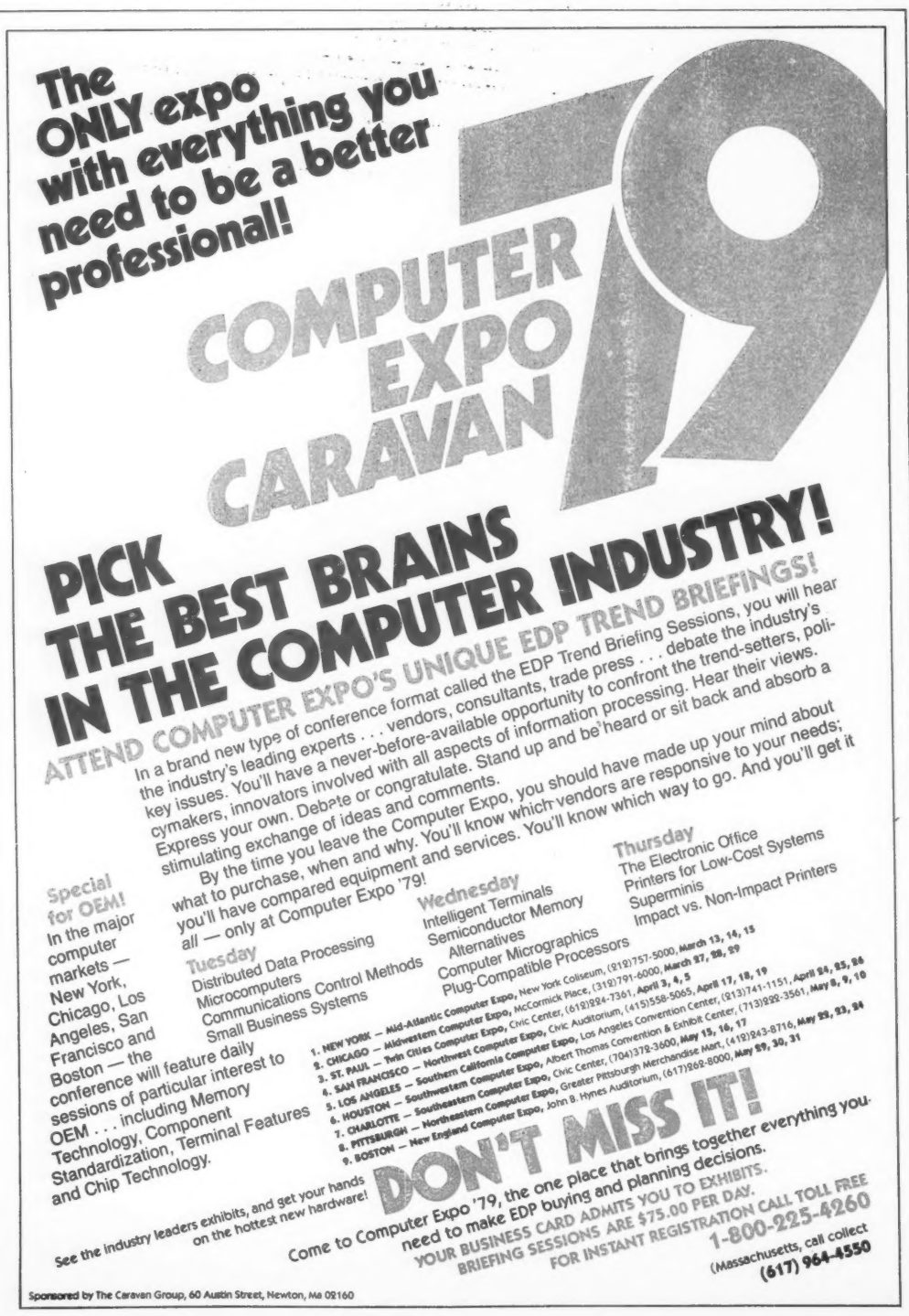
This numbering system is an effective tool. However, if too many subdivisions of a section are made, the numbering could get unwieldy.

Each table and illustration should be numbered using a slightly different scheme (2-1, 2-2, 2-3, etc.). Here again, the first digit identifies the chapter; the second digit is the table or illustration number.

After including a table of contents, list of illustrations, and list of tables before the text, a title page should be placed on the draft copy and the draft submitted for review.

At this point, the text should be thoroughly proofread to ensure technical and physical accuracy. The end result will be a fine piece of written work that is well-structured and aesthetically pleasing.

Zaneski is a technical/marketing writer for Program Products, Inc. in Montvale, N.J.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Architecture Upgrades Planned

Decnet to Get Multinet Compatibility

By Ronald A. Frank
CW Staff

MAYNARD, Mass. — Digital Equipment Corp. will soon upgrade its Decnet data communications architecture to make it compatible with non-DEC network environments.

Decnet was originated as a communications vehicle to allow major DEC processors to operate in communications nets. In its first phase, each processor series received the necessary layered structures to allow similar CPUs to operate in one network.

The second phase of Decnet, now being completed, introduced some uniformity to the architecture so the various processor series could intercommunicate within a Decnet environment. These series included the Decsystem-20 family, the PDT line, the VAX units, the PDP series and the LSI-11 line. Using Decnet, these can now be combined into an all-DEC network configuration.

DEC is now set to add capabilities that will expand the network architecture to allow other protocols and networks to be interfaced with the Decnet equipment, according to Charles W. Stein, distributed systems program manager at the company.

If Decnet is to be of optimum use to data communications users, it will have to provide capabilities to connect customers into X.25 nets, AT&T's future Advanced Communications Service (ACS) and IBM's Systems Network Architecture (SNA), Stein said.

This approach marks a departure because most vendor network architectures seek to restrict users to environments using the vendor's own equipment. Several firms have developed interface features with SNA, but only as an interim step toward maximizing the use of non-IBM equipment.

Stein believes tomorrow's users will draw on capabilities from a combination of architectures, public data networks and protocols. The architecture that offers the widest range of options will prove to be the most valuable for users, he said.

Officially, DEC has not commented on how Decnet will be expanded. The first step is likely to be composed of additions to the existing architecture. The Network Services Protocol will be expanded with a transport-level interface, improved end-to-end data-handling features and added routing algorithms.

(Continued on Page 62)

Burroughs Terminals Feature Micro-Controlled Subsystem

DETROIT — Modular construction and a microprocessor-controlled I/O subsystem that reportedly eliminates the need for a separate controller from the host computer are two features of a series of terminals recently introduced by Burroughs Corp.

The BMT terminal family — consisting of the MT 200, MT 300 and MT 600 — can interface with all Burroughs mainframes and can share data communications lines with the company's other terminals and terminal computers, according to a spokesman. Transmission rates range from 600- to 9,600 bit/sec.

Each unit has its own memory and can operate its own set of peripherals, including CRT screens, keyboards, printers and magnetic card readers.

Since the memory subsystems are packaged separately, memory size can be tailored to a user's particular needs, the spokesman added.

The MT 200 terminal is a preprogrammed, CRT-based unit that offers a choice of a 5-, 9- or 12-in. high-resolution CRT screen. The screen can handle up to 40 char. and has a capacity of 15 lines. It also features a 96-character, upper and lower case Ascii character set and can be equipped with an alpha, numeric or alphanumeric keyboard.

MT 200 options include a 4.5- or 8.5-in.-wide matrix printer; a plastic card magnetic stripe reader; a personal identification number (PIN) keyboard; and an application program product suitable for either bank- or business-oriented functions.

The MT 300 is a preprogrammed unit featuring a 90 char./sec bidirectional printer with either a 4.5- or 8.5-in.-wide printing format. This terminal accepts variable-width documents for single-line validation and has the capability of printing a continuous form journal.

The terminal's printer is buffered for sustained operation and can print reverse images — white against a black background — to highlight or create special forms, the spokesman noted.

(Continued on Page 67)

Communications Act Rewrite Expected to Get to House Soon

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — A rewrite of the Communications Act of 1934 will be introduced in the House of Representatives within the next month by Rep. Lionel Van Deerlin (D-Calif.), chairman of the Subcommittee on Communications. This was the prediction made by Charles Jackson, staff engineer to the subcommittee, at a Communication Networks 79 session here recently.

Fast action on this rewrite is a real possibility, and a final bill could be on the President's desk "within a year," Jackson said.

In the Senate, Sen. Ernest F. Hollings (D-S.C.) will introduce omnibus amendments to the act this spring.

The rewrite process is based on a reexamination of the basic law. Innovative technology spurred the rewrite of the 1934 act, Jackson noted.

CW at Networks 79

Computerized message systems is just one technology that doesn't fit well under the framework of the present act. In this type of service proposal, the Federal Communications Commission (FCC) tends to worry more about whether the existing law covers

(Continued on Page 67)

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Serial Impact Printer Compatible With Ontel Terminals

LEXINGTON, Mass. — NEC Information Systems, Inc. has introduced a microprocessor-controlled serial impact printer that is compatible with Ontel Corp. OP-1 and OP-1R terminals. The printer operates in receive-only mode at speeds up to 55 char./sec.

The Spinwriter Model 5500N links to the intelligent terminals via a parallel interface and a 25-pin connector cable. It incorporates a low-noise thimble print element which reportedly delivers high-resolution plotting and graphing as well as typewriter-quality printing.

The 5500N can produce an original and up to seven copies in a print run and can use full 128-char. thimbles capable of printing the entire Ascii character set, special fonts and other symbols, a spokesman said.

Printing options for the unit include correspondence style, 10- and 12-pitch printing, proportional spacing, dual fonts, bilingual and multilingual fonts and both subscripting and superscripting capabilities.

The printer can plot at densities of up to 5,760 plot/sq in., the spokesman added.

The 5500N is priced at $2,605 from NEC at 5 Militia Drive, Lexington, Mass. 02173.

DEC Changing Architecture To Extend Compatibility

(Continued from Page 61)

This will be known as Decnet Phase III and will add network management capabilities and the ability to establish circuit links between virtual terminals within the network. This implementation is expected to be introduced by spring.

Expansion Plans

Later in 1979, Decnet will be expanded to be compatible with X.25 public data nets, ACS and SNA. Other capabilities may be added if there is user demand.

Applications software will be introduced allowing Decnet "subsystems" — with DEC processors, terminals and controllers — to use the network facilities which users decide are best suited to meet specific needs. In effect, Decnet will become transparent to the network facilities that are used.

A key element in the Phase IV addition is expected to be the introduction of X.25 capabilities to Decnet. Currently, there is an X.25 capability available in the UK for the RSX11M operating system, but it is designed to transmit data from CPU to CPU, not from terminal to CPU.

Possible Reconfiguration

The Decnet Phase IV enhancement will be implemented through a combination of hardware and software. One approach apparently being considered is the reconfiguration of one PDP-11 processor to operate as a front end/controller to perform the necessary network functions. By adding network control software and programs that would handle any protocol differences, Decnet subsystems would be able to interface with X.25 nets, according to industry experts.

If a PDP-11 front end were used as a communications controller, this would also provide a way to make Decnet compatible with IBM's SNA and other network environments not now supported by the DEC architecture.

DEC's recent filing with the Federal Communications Commission of its position regarding the ACS from AT&T made it clear that the vendor favors the broadest possible interconnecting network capabilities. DEC's telephone industry group is working closely with ACS technicians from AT&T to develop systems software for the proposed Bell network.

Net Planners' View

DEC network planners reportedly view a network as a transparent transport mechanism to which Decnet subsystems should be freely interfaced. They see this as the best opportunity for users to interconnect DEC equipment with all types of network services.

Using this approach, terminal subsystems operating under Decnet architecture with DEC hardware will be able to transmit data to IBM mainframes as well as other types. The PDP-11 front ends could provide the necessary control functions to allow the Decnet subsystems to operate on a variety of networks.

A test version of an X.25-compatible data link control feature of Decnet reportedly has been running for some months on the Datapac packet net of Bell Canada.

In addition, DEC is said to be planning to incorporate Tymnet, Inc. facilities into its in-house data communications network. Both these steps are seen by industry sources as providing possible test data for the expanded Decnet functions.

While other minicomputer vendors have planned architectures which allow limited X.25 and/or SNA interface capability, DEC is believed to be committed to the concept that its Decnet architecture should be free of any network interfacing restrictions.

DEC spokesmen refused to comment on how the additional Decnet features will be implemented.

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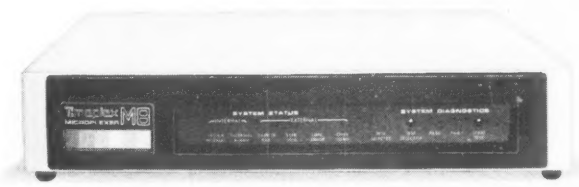

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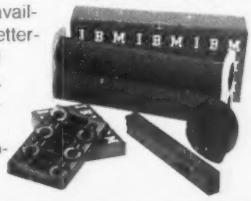

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FCC Hit as Biggest Communications Barrier

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — It is a wonder that there is any competition in the telecommunications area considering the regulatory barriers that exist, according to Dean Burch, former chairman of the Federal Communications Commission (FCC).

Speaking at a session dealing with regulatory barriers to network growth at the recent Communication Networks 79 conference here, Burch said the FCC tries to rely on the marketplace whenever possible to make decisions. Each ruling is made on a piecemeal basis and seldom does the commission look at the big picture or try to evaluate the long-term impact of its decisions.

Dr. George Mansur, president of Aeronautical Radio, Inc. (Arinc), said current FCC rules seem designed to impede service. It is erroneous to assume the public interest requires bars to entry by those who want to provide users with new services, he maintained.

Any proposed service that promises to alter the way in which a market is divided is contested at length, he said, pointing out that the average time required by the FCC to read a major decision is now seven years.

Such regulatory delays can have disastrous effects on businesses that plan network services, Mansur said. The regulatory process affects all portions of communications, and those planning to offer or use new services must consider the impact of regulatory delays in all their business decisions.

The Information Age can be achieved only if innovation is stimulated, but the FCC cannot foster competition when it causes delay through the regulatory process, according to C. Gus Grant, president of Southern Pacific Communications Co.

The greatest barrier of all is the 1956 Consent decree between the government and AT&T, according to FCC Commissioner Joseph Fogarty. Any carrier can set up a competing subsidiary and enter competitive service areas except AT&T.

"I would like to deregulate terminal equipment tomorrow, but that would put AT&T out of business, and that is wrong," Fogarty said.

AT&T cannot participate effectively in a competitive telecommunications area as long as the Consent Decree remains in force, he said. He believes the Justice Department is to blame for not having done something to modify the decree.

A.G.W. (Jack) Biddle, president of the Computer & Communications Industry Association, told the session that AT&T wrote the decree and then sold it to the Justice Department. Despite the decree's existence, AT&T has violated its terms by selling its Unix software and allowing Teletype Corp. to sell OEM versions of the Dataspeed 40 CRT, Biddle said.

If AT&T were truly interested in expanding the use of telecommunications facilities, it would encourage increased use of its facilities by all competitors, he contended.

Such a policy would mean more income for both Bell and its competitors, Biddle said.

However, AT&T has instead opposed the entry of competing services so it can write off obsolete equipment. This process stifles the introduction of innovative services for users, Biddle charged.

Speaking for AT&T, James Olson, vice-president, said the relevant issue in data communications is how well the needs of users are being met. AT&T is not looking to regulation as a protective umbrella, he said, but neither should the FCC deny users the right to have modern services provided by Bell.

AT&T favors full competition, but ultimately this will mean usage-based pricing rather than flat-rate services, Olson said. Users will pay for the time that they use the facilities, he explained.

CW at Networks '79

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Micro-Controlled System One Feature of Terminals

(Continued from Page 61)

to highlight or create special forms, the spokesman noted.

In addition to a reader, a PIN keyboard and a choice of program products, MT 300 options include a 5-, 9-, or 12-in. CRT screen.

Two Versions of MT 600

The final terminal in the series, the MT 600, is a user-programmable, CRT-based unit that is interactively linked to the host computer. After a particular form is generated by the user's computer and transmitted to the terminal's screen, data can be entered through the keyboard, verified by the operator and printed or sent back to the main computer system, the spokesman said.

The MT 600 can perform forms creation and forms completion programs off-line or function on-line as a conventional data entry station, he added.

Two models make up the 600 terminal series, the more powerful one offering up to 96,000 bytes of memory and providing the four basic arithmetic functions plus negative or positive sign values, the Burroughs representative stated. Both models, however, have a 12-in., 2,240-char. CRT screen and a microprocessor-controlled diskette subsystem that can store up to 160,000 bytes of data and control instructions.

MT 600 printer options include a choice of a journal printer or a journal and document validating printer.

Prices for basic MT 200 and MT 300 systems are $2,500 and $3,490, respectively, excluding the required application program product, which may be licensed for a one-time fee of $100. The basic MT 600, including Forms Definition Language programming software and an on-board compiler, costs $3,290.

The terminal systems can be leased from Burroughs at $106/mo for the MT 200, $150/mo for the MT 300 and $130/mo for the MT 600. Prices for modular peripherals range from $275 for the keyboard to $1,990 for a printer, and add-on memory costs $100 per 4,000-byte increment, the spokesman said from One Burroughs Place, Detroit, Mich. 48232.

The Burroughs BMT family of terminals offers modularity for flexibility of configuration.

Rewrite Expected In House Soon

(Continued from Page 61)

the issues involved instead of concentrating on the merits of the service, he said.

Commenting on a recent FCC action, Jackson said it was not sound policy for the commission to require GTE Sylvania and Telenet Communications Corp. to file so-called Section 214 data to justify the desired merger of the two firms. This type of data is required under the act when a common carrier proposes to offer a new service or expands its facilities to add to existing services.

In the case of the merger proposal, the potential antitrust aspects are the proper domain of the Federal Trade Commission and the Justice Department, not the FCC, especially if Section 214 economic information must be provided, he told the attendees.

Dissatisfaction Expressed

In a related talk, Walter Hinchman, former chief of the FCC's Common Carrier Bureau and now an independent consultant, told the conference the act should be modified because the telephone industry has demonstrated it is either unwilling or unable to exploit new technologies for public services.

To offer such services at reasonable, nondiscriminatory rates and to respect consumer rights concerning the use, resale and sharing of services are other reasons why the law needs modification, Hinchman said.

"With all the little companies peddling intelligent terminals these days, an OEM or a large EDP end user like me can't be too careful. Sure, they may be able to design a good terminal. But can they deliver it? Service it? Is the company's president also the service manager and the installer? So I did a lot of looking around. That's when I came across the MDT 400 manufactured by Compugraphic for applications like distributed processing, text editing, and data communications.

" 'CompuWho?' I said. But then I found out that Compugraphic is a $180,000,000 New York Stock Exchange company – the world's leading manufacturer of computer driven phototypesetting systems – with a nationwide field service force of over 300 service engineers.

"With Compugraphic I don't have to worry. Even though their MDT 400 lists for under $4,500, it's got everything I really need – full user programmability, hardware and software modularity, a powerful 8085 microprocessor, up to 32K bytes of memory, integral mini-disk, a disk operating system, and an optional printer. I can even get substantial quantity discounts. And they'll service it themselves all over the country for me.

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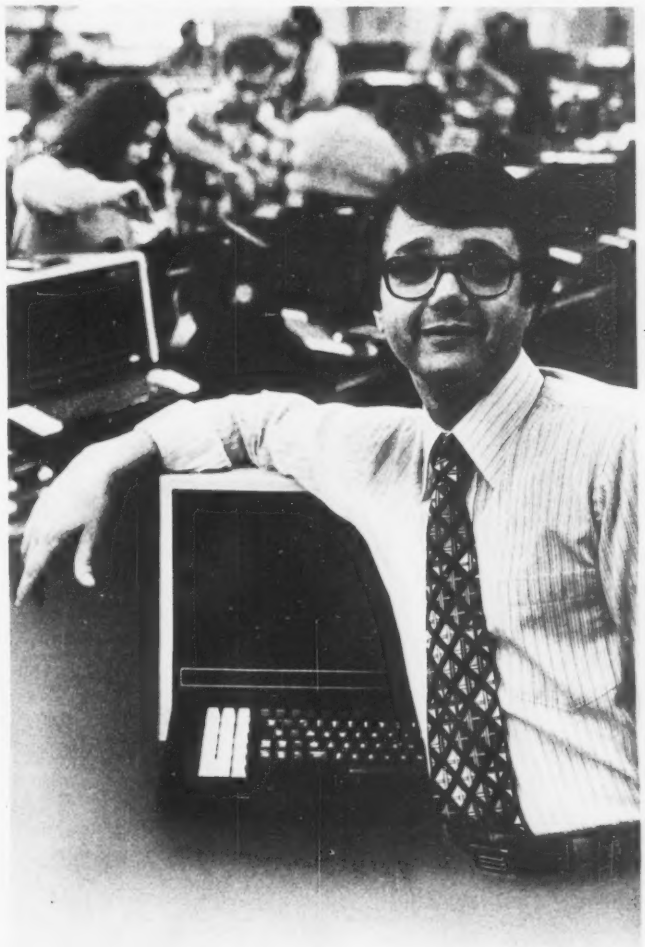
The MDT 400 – the cost-effective, intelligent terminal at a sensible price. Manufactured intelligently by Compugraphic. For more information, clip and send the coupon today.



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Predicts 'Packet Switching' Obsolescence

Doll Sees End to Single-Vendor Networks

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Data communications users can no longer look to one vendor to solve their network problems. Instead, users will have to select from a menu of available network services in order to meet their communications needs, according to Dr. Dixon Doll, consultant and president of the DMW Group.

Speaking at the keynote session of the recent Communication Networks 79 conference here, Doll said that within five years the term "packet switching" will be obsolete. It will be replaced by network services that combine various types of transmission modes to provide diversified network facilities to users.

Users are beginning to realize that their network requirements do not have to be geared to large centralized data bases at single mainframes. Instead, the processing of data can take place at various points in a net using distribted processing concepts.

The need for faster terminal response time, reduced network traffic and better error control is making users come up with new network configurations and transmission modes to meet their requirements, Doll said.

While there is no reason to keep going back and forth to a large central mainframe, there are also traps waiting for the user who takes a distributed DP approach. Among these are loss of control over the DP function, escalating people costs and regimentation and duplication of data, he warned.

Because of these potential problems, good management holds the key to successful distributed DP network applications.

ACS Badly Needed

Turning to AT&T's proposed Advanced Communications Service (ACS), Doll said everything outlined in the offering is badly needed by users and there is no basic disagreement with what the Bell System wants to provide.

Nevertheless, the Federal Communications Commission's regulatory evaluation process serves an important function in making sure that ACS will not have an anti-competitive effect on other carriers providing value-added network services to users, he noted.

ACS offers for the first time a meaningful solution to the message-switching needs of users, Doll said. It will also include an inner layer of Bell System tandem-switching network facilities that will be important to future users.

These phone company facilities will give the ACS net the ability to dynamically allocate capacity among backbone nodes to improve network response time where and when high usage levels occur, he predicted.

Despite their capabilities, packet-switched services are not plug-compatible replacements for today's private-line nets. While they offer benefits for unpolled start/stop terminals, they are mainly a usage-sensitive medium that does not support polled synchronous terminals and high-speed batch operations, Doll said.

The various network architectures originated by the mainframe vendors will have to be modified so they are more suited to public data network operations, according to Doll. The minicomputer suppliers are creating peer-coupled nonhierarchical architectures that lend themselves more to public network operations; larger mainframe suppliers, such as IBM with its Systems Network Architecture (SNA), are developing

(Continued on Page 72)

CW at Networks 79

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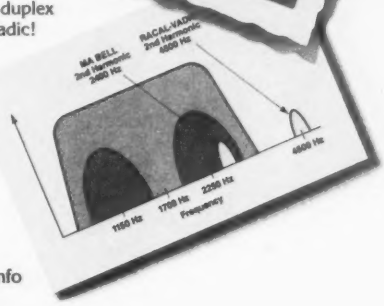

So Racal-Vadic has done it again, Ma. The real winners are remote terminal users who no longer have to settle for 300 bps operation. Now, merely by replacing their present coupler with the VA3434, they can operate at 1200 bps full duplex, while retaining the portability that an acoustic coupler provides.

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Control System Urged for Net Management

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A communications network manager goes to his office in the morning, tears off a computer-generated network diagnostic report, lays it on his boss' desk and takes the rest of the day off, all network errors having been corrected immediately and automatically.

That scenario, even today, is not as outlandish as it sounds, according to one speaker at the Communication Networks 79 conference held here two weeks ago.

Dr. David Lyon, director of research and development at Intertel, Inc., told a conference session that a good network control system is the key to effective network management. Such a system is a good investment at "the front end of network development," according to Lyon, who claimed the extra cost is justified by the decreased downtime and relatively small management staff a good network control system makes possible.

CW at Networks 79

Lyon defined network control as having a single control point connected to every remote site, each site being directly answerable to the control center and in constant, direct communications with it.

Network control systems, he said, are measured by how well they cut downtime and, in communications, "time is money," he reminded his audience.

"Networks are beautiful when they are working, but horrible when they go wrong," he stated. When there is a problem, every step of error recovery can be directly measured by the amount of time it requires. The last thing a user wants, he said, is "a ticket agent in his diagnostic loop."

In most networks, it takes time to find out there even is a problem, so time is lost locating the problem, requesting service and then getting the service. The obvious solution to that mushrooming loss of network time, he said, is faster

(Continued on Page 76)

Doll Predicts Net 'Menus'

(Continued from Page 71)

more rigid hierarchical net structures, he said.

Digital Equipment Corp. is among those modifying its architecture to support a broader line of equipment. Decnet will soon have features that give users easier access to a wider variety of network options, Doll forecast.

Vendors must devise methods to move control functions for polled terminals out to the network. But in doing so, solutions are needed that minimize the alternation of software already in place, he continued.

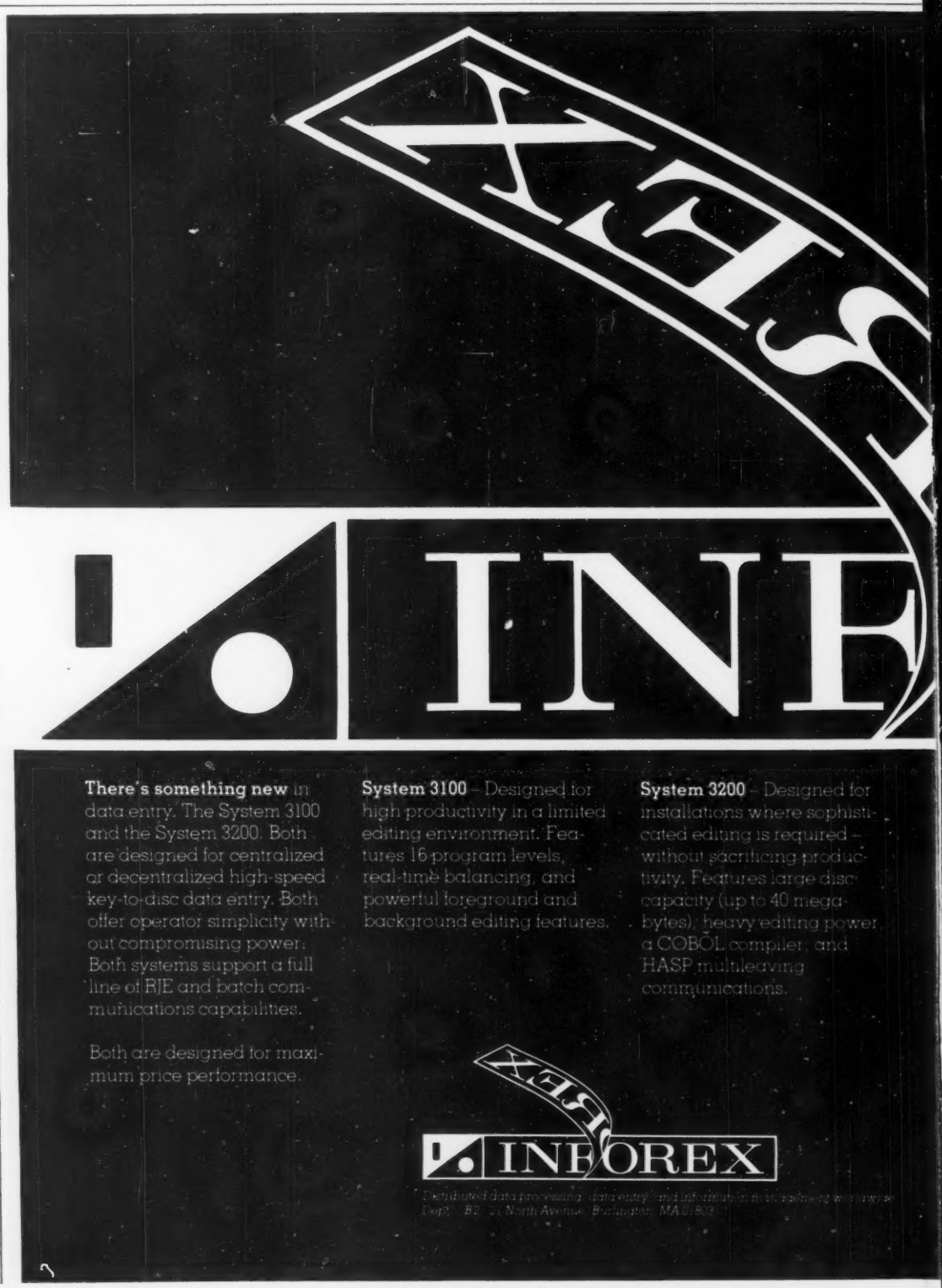
Users resist tampering with software that is in place and working. Thus vendors will have to devise ways to meet user network needs without software upheaval, he noted.

While vendor architectures will have to provide compatibility with public data nets, they must not duplicate capabilities already available in these value-added services, Doll said, adding there are no easy solutions to adapting vendor architectures.

Users need nets that are not dependent on specific hosts. An example of this type of CPU is the IBM 8100, which Doll said is more sensitive to the needs of remote terminals.

No single vendor offers solutions that meet user needs. As a result, users will have to connect to private, public and shared industry nets to meet their corporate data requirements.

A complicating factor in this area is that there are only a limited number of people who understand the problems and the potential solutions. The universities have missed the boat in not training a larger number of students in the communications area, according to Doll, who said this means a shortage of qualified experts will continue for at least the next few years.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With Help of Microprocessors

Quick Answer to Business Moves Seen Possible

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — High-speed telecommunications services with the help of microprocessors and sophisticated office equipment will make possible almost instantaneous reaction by management to changing business conditions, according to Richard E. Wiley, former Federal Communications Commission (FCC) chairman, who delivered one of the keynote addresses at the recent Communication Networks 79 conference here.

Electronic communications will increasingly substitute for transportation, with teleconferencing taking the place of face-to-face meetings.

Common carrier services combined with DP technology and high-speed printers already offer innovative services, which seem to increase in number almost every week. AT&T has announced its Advanced Communications Service, Xerox Corp. has petitioned the FCC to establish the Xerox Telecommunications Network (Xten) and the U.S. Postal Service has proposed Electronic Computer-Originated Mail, Wiley said.

CW at Networks 79

A user's commitment to a particular method of network operation may foreclose the use of other equipment types or networks. In such cases, a company's entire investment could become obsolete.

On the other hand, failure to make use of the benefits provided by new products and services could mean a "substantial competitive disadvantage to your company," Wiley warned conference attendees. Another speaker, Jack Epstein of Booz Allen & Hamilton, Inc., said that one of the network user's major responsibilities is to configure a local distribution network.

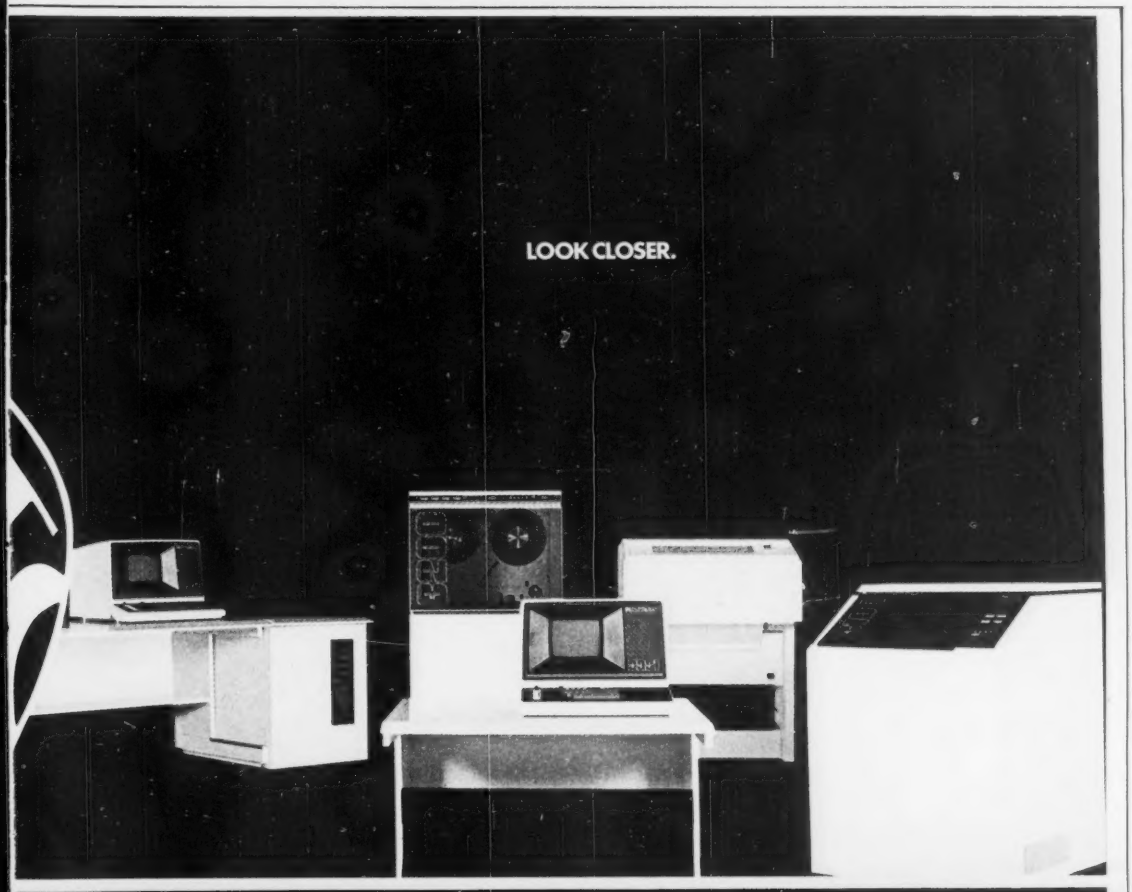
Alternatives to Local Loops

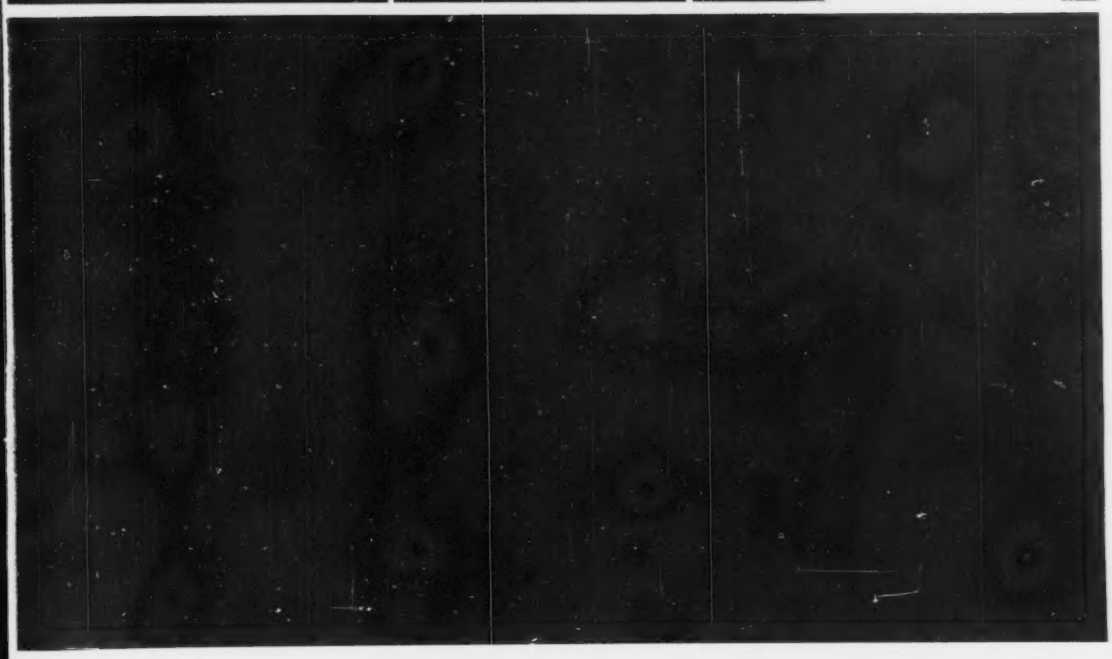
Some network service proposals include alternatives to phone company local loops. The most recent is the Xerox Xten announcement; this service will use microwave and cellular radio technologies to configure links to potential user sites.

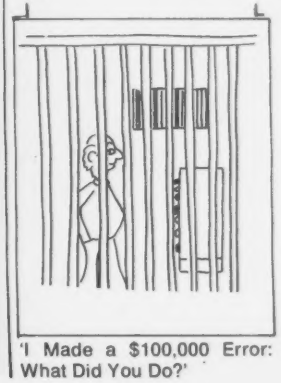
The customer-owned and maintained building blocks of local loop nets may include microwave, infrared optical and various cable-based systems using twisted wire pairs, co-axial cable or optical fiber cable. The on-site network has been badly neglected and will provide the most fertile ground for network development, Epstein predicted.

Prof. Anthony Oettinger, director of the Information Policy Resources Program at Harvard University, told attendees that regulatory policy is directly related to the price at which services ultimately can be offered. Speaking of the many on-going regulatory proceedings that affect communications services, Oettinger warned users not to "expect miracles. Things will continue to be messy."

Some of the regulatory constraints are complex, and users interpret them in varied ways. In any case, users should engage the advice of an attorney in these matters, he advised. "He may not know more than you, but you can always put the monkey on his back," he said.







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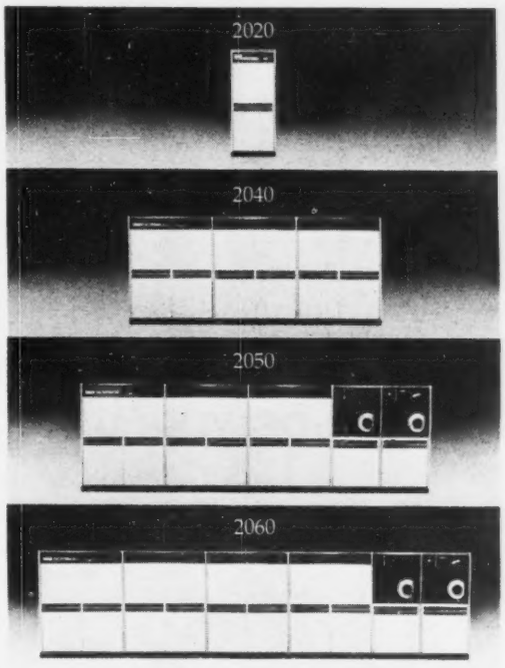

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TDM Divides Data Rates

CHATSWORTH, Calif. — Intended to achieve data transmission economies with Dataphone Digital Service (DDS) circuits or regular telephone lines by splitting the available data rate between several terminals, Micom Systems, Inc.'s Micro700 is a 4-channel, bit-interleaved, synchronous time-division multiplexer (TDM).

Micom Micro700

The Micro700 reportedly permits up to four synchronous data terminals operating at speeds up to 19.2K bit/sec to share a telephone line or DDS link.

Individual channels can operate at one-quarter, one-half or three-quarters of the phone line's modem data rate, according to the firm, and both Automatic Remote Configuration and Dynamic Channel Assignment options are provided.

The Micro700 also includes a Control Signal Option to provide support for dial-up access to individual channels or half-duplex extension tail-circuits.

Priced at $995, the TDM is available from Micom at 9551 Irondale Ave., Chatsworth, Calif. 91311.

PDP-11 Linked To DDS Phones

IRVINE, Calif. — The Quadracall module from Able Computer Technology, Inc., reportedly allows a Digital Equipment Corp. PDP-11 minicomputer user to establish a data link by dialing any telephone in a Direct Distance Dial network.

The quad-size module provides an interface between up to four Bell 801 automatic calling units (ACU) and a PDP-11 Unibus system. The module features four Berg connectors and can be plugged into a "small" peripheral controller slot, a spokesman said.

Quadracall costs $1,200. Able Computer Technology is at 1751 Langley Ave., Irvine, Calif. 92714.

Control System Urged for Nets

(Continued from Page 72)

and more exact error diagnostics.

Speedy error diagnostics is especially important in a multivendor network and, he pointed out, just about every network depends on at least two vendors — the computer equipment manufacturer and the phone company that provides the communications lines.

If a network has an efficient network control center, the problem is diagnosed in seconds, service is not delayed and the affected site is "back on-line in minutes," providing the service for which the customer has paid.

A full network control system would make use of dial-up backup lines. In case of a transmission problem, Lyon explained, the system would automatically switch to other dial-up lines previously arranged through the telephone company.

Such backup capability is critical, according to Lyon, who noted that telephone lines are "the most fragile part of a network."

Sophisticated network control systems are the only way to go in network management, Lyon reiterated. He sees the control systems becoming highly automated in the near future, providing increased compatibility of components.

'Don't Hold Your Breath'

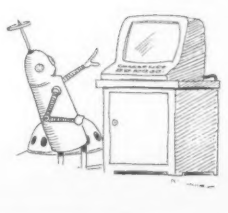
Looking into the distant future, Lyon predicted increased integration of communications networks and data processing as networks become more digital and less analog. The networks of the future will need more sophisticated software support and will require "high-level standardization."

On the subject of standards, Lyon noted increased interest in the Consultative Committee on International Telephone and Telegraph (CCITT) and predicted that "over the next two years there is going to be a lot of activity" in network standards on the international level. He also noted there have been some network interface proposals by U.S. standards groups recently.

But "don't hold your breath," he advised, predicting "a lot of wrangling" before meaningful standards are promulgated either nationally or internationally.

Lyon cautioned his audience that although most large, multitiered and multipoint networks seem similar, they are very much different, depending on how they are operated and who operates them.

The good news, he said, is that network applications are outpacing the existing technology. Unlike the mainframe industry, in which the designers are usually way ahead of the market, in communications networks "users and their problems create the next level of technology," Lyon said.



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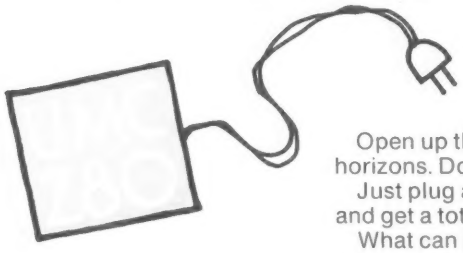

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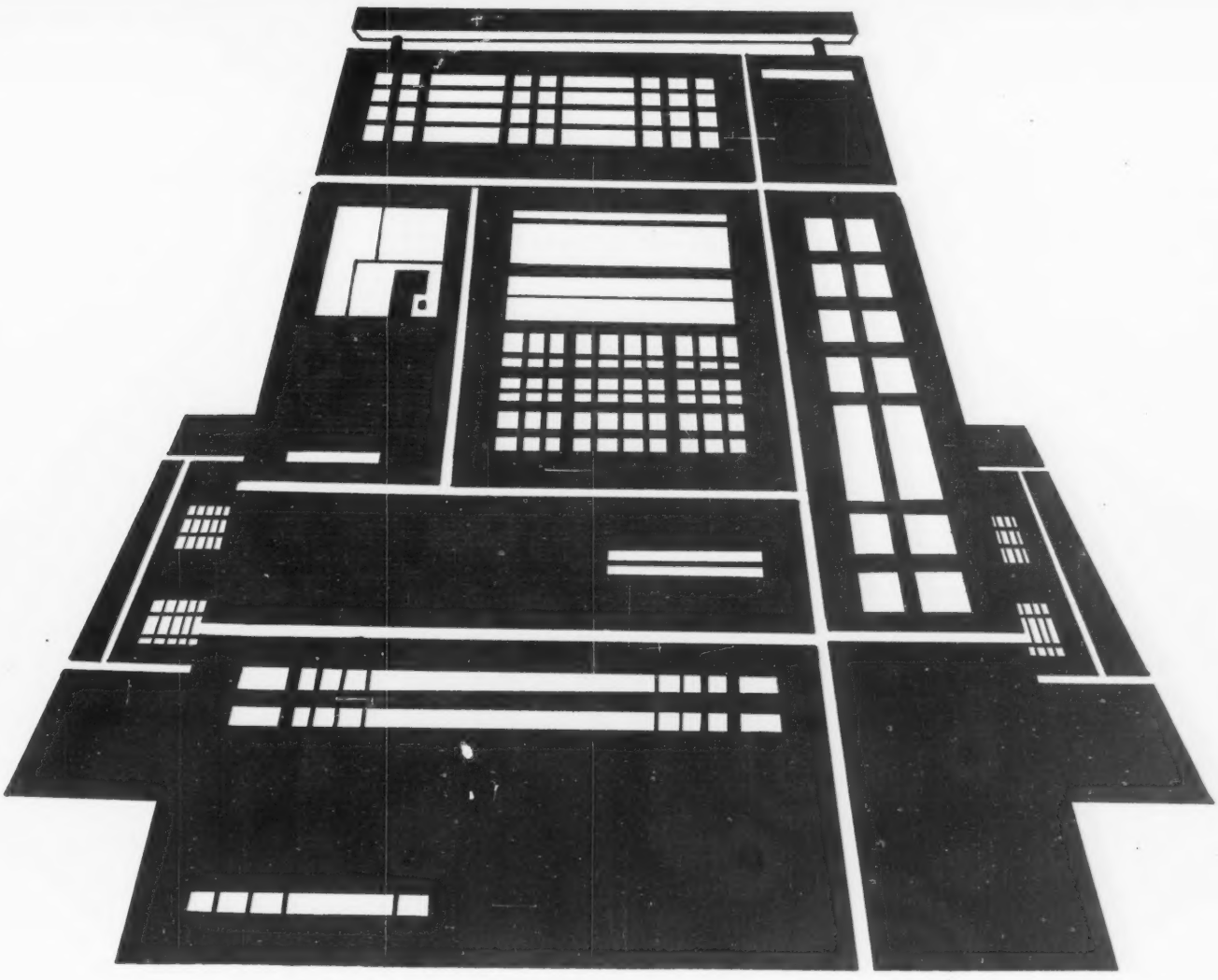

Power for Whom? And for What?

By Herbert I. Schiller

For at least a decade, scores of nations, especially poor ones, have been complaining about a massive inflow of cultural/informational material. TV programs, movies, magazines, books, records and even tourists have been the visible products moving in swelling volumes from a few industrialized centers — most heavily from the U.S. — to the rest of the world. One of the most highly regarded principles of American diplomatic and economic leadership - the free flow of information — is seen by many outside the country as a license to swamp the universe with made-in-America cultural/media artifacts.

The complaints against this invasion and the resulting annihilation of national cultures have, in the very recent past, achieved some modest recognition. The inadequacy of the resources in the information sector of many nations has been noted. The global presentation of news from a Western perspective is partly acknowledged by media controllers in the U.S. and Europe.

In sum, the one-way flow of *visible* information is now, a least, understood as a problem, by many in both developed and undeveloped countries — although remedial action remains elusive and probably distant.

Strange Irony

There is a curious irony about this. At the same time social awareness about one sector of information flow is growing, a more comprehensive and far-reaching structure of worldwide domination in informational relationships — computer communications —

(Continued on In Depth/2)

IN DEPTH
IN DEPTH
IN DEPTH
IN DEPTH

POWER FOR WHOM? AND FOR WHAT?

IN DEPTH

(Continued from In Depth/1)

may be in the process of creation.

This new sector of communications is largely unperceived in a popular sense. Even to those knowledgeable, it defies easy cataloguing or appraisal. Yet, as the Senate Foreign Relations Committee was told two years ago, "a very large amount of data about all sorts of matters — individual and national, social, commercial, economic and military — is now being processed and transmitted between international super-corporations, national governmental bureaucracies and scientific and academic institutions. Already, institutional patterns have developed to facilitate these activities.

"An examination of the structures and relationships now in place may help to create a realistic assessment of the present, largely invisible world information order. Unless the social forces underlying and determining current computer communications are revealed and understood, ground gained in overcoming information dependency in traditional areas may be retaken by those who dominate the new terrain."

In attempting such an examination, it must be admitted at the outset that the complexity of the new information technology is beyond simple exposition. The developments are difficult to ascertain because of the private nature of most of the arrangements and the technical sheath that conceals many of the socioeconomic factors.

Additionally, the field is new and changing rapidly and has not yet congealed into hard and fast relationships. For these reasons, what follows must be regarded as far from comprehensive and is intended to be exploratory, suggestive and only tentative.

One central issue is addressed: How is the information dependency of people and nations likely to be affected by the advent of the new instrumentation and its control mechanisms?

Vendors Few in Numbers

The singular institutional attribute of the new communications technology is that almost all the hardware is produced by a very small number of private companies.

In the U.S., the telephone industry is largely the domain of one corporation, AT&T, and its production subsidiary, Western Electric Co. In the computer industry, IBM stands far ahead of its few competitors.

In the manufacture of communications satellites, a couple of firms dominate the market. Because it is a more recent development, the electronics industry — which supplies the inner components for much of the equipment — is less concentrated.

A related structural factor is that the international market has crucial significance for the well-being of large-scale American enterprises. As older U.S. industries — textiles, footwear, even steel — have lost ground steadily in overseas markets, the new communications technology industry (as well as other research and development industries) has been assigned a priority role in maintaining American world economic hegemony.

Heavy sales of sophisticated equipment may compensate, at least in part, for declining exports and influence in other sectors. Therefore, the communications industry, which includes data generation and transmission, assumes enormous importance well beyond its substantial financial contribution.

In the business of communications technology, there is also one corporation which dominates domestically and internationally. Angeline Pantages described this condition in the September 1976 *Datamation:* "Watching the movements made by companies and governments in the industry worldwide is like watching 15 chess matches going on at the same time. Every match has one thing in common, though. IBM seems to control both

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POWER FOR WHOM? AND FOR WHAT?

IN DEPTH

queens on every board."

Or as Rex Malik, the unauthorized biographer of IBM, wrote in *And Tomorrow the World?*, "IBM is not just a major international company in the area of computing, it is the international environment."

Currently, IBM has 130,000 workers abroad in 21 plants and 10 laboratories. In 1975, it received more than half of its revenues from business outside the U.S. In most of the major, developed countries in the world, its share of the communications market starts at 50%.

The size of the market for computers already is impressive. Its near-term potential, projecting current installation trends, suggest that computers will constitute one of the world's largest industries. The power these developments confer on a corporation that now dominates the field, therefore, hardly can be overestimated.

As Simon Nora, the Inspector of Finances in France, wrote, "IBM could become one of the great world regulatory systems . . . a planetary empire."

The current situation and the short-term trends are shown in Fig. 1. In 1975, IBM had 52.6% of Western Europe's market for general-purpose computers. Its share in 1980 is estimated to hold at 51%.

In Japan, which is making a determined effort to achieve independence in the computer business, IBM's share of that market in 1975 was 26%.

Because computer communications are seen as crucial for profit, facilitating industrial development and, no less, securing cultural/informational influence, nowhere are commercial rivalries more evident than in this field. But the field of rivals is limited by the economic marketplace that prevents poorer nations from influencing the design and production of the hardware of the new information age. And cultural/informational dependency for the underdeveloped world almost seems built into the present kind of information instrumentation.

The Software Factor

Less observable, though no less important, are the instructions for organizing, processing and transmitting the data as well as the data itself — the software.

One of the most important categories of software is data base. Data bases are constructed for many purposes, the most familiar of which is the academic-technical-scientific base. This is data in a specific category or area — chemistry, physics, medicine, education, sociology — which has been stored in some suitably accessible form. The size of a base varies, but it may contain as many as millions of records.

Other data bases are organized for the production and marketing needs of large, private corporations (for payrolls, raw material flows, property ac-

(Continued on In Depth/6)

WORLDWIDE COMPUTER INDUSTRY INSTALLED BASES (SALES VALUE)

COUNTRY	AS OF DEC. 31, 1975 (000)	AS OF DEC. 31, 1980 (000)
United States	$39,750	$62,700
Western Europe	22,050	38,800
Other countries (Including Japan)	11,600	23,050
	$73,400	$124,550

Source: Sperry Rand (Datamation, September 1976)

Figure 1

Users. Why waste $2500-$5000 on every line printer you buy?

If you're upgrading your present printer, or adding 300 or 600 LPM line printers from DEC, BASIC FOUR, and others, you're wasting $2500 to $5000 per printer. By switching to Centronics' 6000 Series Band Printers you can save thousands of dollars and get the latest state-of-the-art line printer technology. Immediately.

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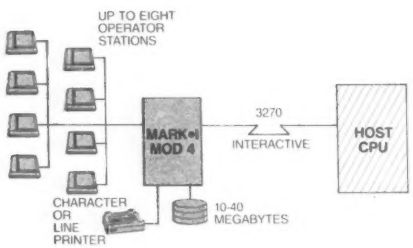


Thus, when you must configure systems to meet a variety of different needs at a variety of different locations, you can do so with speed, with simplicity, with modular power, and with more configuration options than other systems can offer. All for a starting price, including maintenance, of under $800 a month.

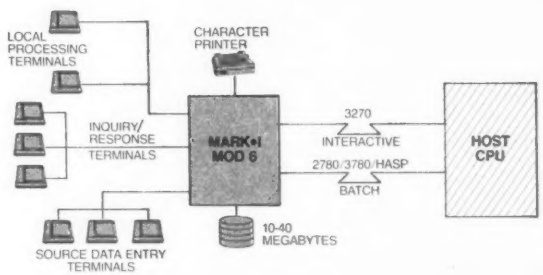
Here are just a few of the options you can install right now:

Option #1: Local processing and "intelligent 3270" functions

Every Raytheon MARK I system comes with two basic capabilities that many suppliers are still only promising. One is the ability to do stand-alone local processing. The other is the ability to perform intelligent 3270 on-line functions.

What is "intelligent 3270?" Just this: the ability to extend massively the capability of a 3270-type terminal network by adding advanced features to the network without systems change, **and without dependence upon the host processor.**

Features such as local format storage, local printing, local data base access, local transaction storage and back-up, and the ability to verify data—field-by-field, record-by-record—without going upline to the host mainframe.



These capabilities are inherent in the MARK I system. A 3270-type network user gets them immediately. So he can bring up local files, data entry functions, and either interactive or batch communications without complex changes to his network.

The key to intelligent 3270 operations is the MARK I's stand-alone processing capabilities. A powerful user-programmable controller supports from one to eight CRT operator stations, a 10 - to 40-megabyte disk data base, and a variety of printers and other peripheral devices. All systems and network communications software comes with every MARK I, so the user need only develop the applications programs he requires.

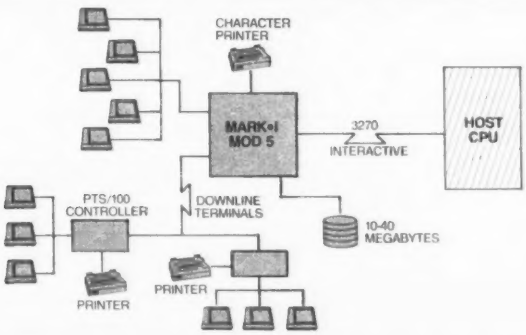
But Option #1 is just the beginning of what you can do for your network with a Raytheon MARK I. Check out Option #2.

Option #2: Interactive, batch and source data entry

The MARK I can become a multi-function workhorse in still another way. Start with its protocol emulators: 3270 interactive (dumb and intelligent), 2780 batch, or 3780 batch, or HASP remote job entry. On a single MARK I, you can run combinations of these emulators at the same time, allowing you to run both interactive as well as batch lines to the host CPU.

While you are executing both of those functions, a group of your operators can also perform source data entry functions on the MARK I. Our new Source Data Entry Package (SDEP) enables users to execute many functions not found in dedicated data capture devices. However, it also does classic data entry functions, such as: automatic cursor skipping; reasonableness checking; crossfooting and arithmetic computation; batch balancing; record searching by number, field or task; table look-up and record insert/delete.

processing options—



What is important to remember about this capability—once again—is that it is available **right now** on Raytheon's MARK I. You can install it today, and be using it tomorrow ...while you continue to execute 3270-type intelligent tasks and 2780 or 3780 or HASP batch-oriented tasks.

Not bad for one low-cost distributed processing system? Right. But now move along to Option #3. Because MARK I can do more than concurrent interactive, batch and source data entry functions.

Option #3: Downline terminals, "upline 3270" tasks

Look at the MARK I schematic. It illustrates still another configuration option of this versatile system.

That option is downline terminal support. What it means is this: that a MARK I controller, in addition to performing its basic local processing and upline 3270 data communications tasks, can also maintain control of a downline multipoint terminal network. Every MARK I can control up to ten drops on its downline link—under 3270 protocol, using Raytheon's powerful PTS-100 intelligent terminals in 3270-mode.

The importance of downline terminal support from a MARK I controller is the essence of any distributed processing system's ultimate value: the ability to offload busy, costly mainframe computers in the easiest, fastest, most cost-effective manner.

Let the MARK I, or a series of MARK I s, control the time-consuming polling of the 3270-type devices. Let the local MARK I data base provide the local formats and record storage facilities that now tie up the mainframe. And let the MARK I communicate upline, selectively, when it must support downline terminals by getting mainframe data for them.

The result: every component of your system, and all the operators it serves, work faster and better. And you can install MARK I systems today.

Option #4: Mix small or large systems on a single network

When you install a MARK I distributed processing system, you are still at the beginning of your network expansion capabilities. Because the MARK I offers a fast, totally compatible migration path to Raytheon's larger MARK II systems.

The MARK II supports multiple job streams. It has a data base capacity of 252 million bytes of local storage. It can support up to 24 operator work stations. Plus all of the protocols available on MARK I. Plus a HASP logical printer. Plus greater numbers of peripherals. Plus faster memories in support of higher speed operations.

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☐ MARK·II

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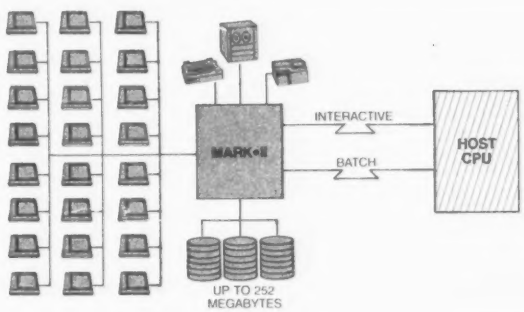

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IN DEPTH

(Continued from In Depth/3)
counting, customers) and for governmental and private administrative units (social security rolls, credit ratings, police records, health statistics and information). This type of data base presently accounts for the preponderant utilization of computer communications.

However, most of these data bases are unavailable for systematic analysis and review because they are regarded as proprietary. Information searches by computer, already widespread, are likely to become standard tools in much of the scientific community's future research activity, to say nothing of their application to everyday business and government operations.

Meaningful information autonomy may then also require participation in the creation of the software. This means the fullest opportunity for the user to know what is and what is not in the data base, the criteria for data selection and classification and how changes may be introduced.

Paralleling developments in the production and marketing of hardware, the software industry, too (apart from the totally proprietary intracompany computer systems) is being integrated rapidly into socioeconomic control structures. This follows from the considerable costs of assembling information.

In a market economy, the questions of costs and prices inevitably play the most important, if not determining, roles in what kind of base will be constructed and the category of user the base is intended to serve (and be paid for). The selection of material that goes into a data base is closely linked to the need for and the marketability of the information service.

If corporate and government bureaucracies are the intended users — which happens most often because of their need and ability to pay — their informational requirements will strongly influence the items put into the base, as well as the classifications adopted for easy retrieval of the information.

DATA BASES IN OPERATION IN U.S. AND EUROPE* 1975

AREA	NUMBER OF BASES	PERCENTAGE OF BASES	NUMBER OF RECORDS	PERCENTAGE OF RECORDS
U.S.	160	58	46,300,000	89
Non-U.S.	117	42	5,700,000	11
	277	100	52,000,000	100

* Exclusive of private, intracorporate bases

Source: "Data About Data Bases" by Martha and Ted Brandhorst in the December 1976 **Bulletin of the American Society for Information Science**

Figure 2

U.S. AND EUROPEAN DATA BASES BY CATEGORY OF INFORMATION* 1975

INFORMATION CATEGORY	NUMBER OF BASES	PERCENTAGE OF BASES	NUMBER OF RECORDS	PERCENTAGE OF RECORDS
Science and Technology	161	58	25,600,000	49
Medicine and Life Sciences	28	10	6,600,000	13
Nonscience-Technology	42	15	4,300,000	8
Science-Technology-Related	46	17	15,500,000	30
	277	100	52,000,000	100

*Exclusive of private, intracorporate bases

Source: "Data About Data Bases" by Martha and Ted Brandhorst in the December 1976 **Bulletin of the American Society for Information Science**

Figure 3

Inventory Only Provisional

An inventory of the data bases in operation worldwide can only be provisional at this time, as new bases are being created continually, both nationally and internationally. In addition, corporate data banks, which comprise the bulk of data bases now in use, must be excluded from this analysis as they are not accessible to the public.

Fig. 2 presents information on 277 data bases (exclusive of corporate bases) in operation in Europe and in the U.S. at the end of 1975. Two hundred small bases which had little effect on the general picture were not included.

With respect to *organized* data — the essential prerequisite for utilization in an information-based economy — the U.S. in 1975 was far ahead of other industrialized nations; almost 90% of the records held in organized data banks were located in U.S. data bases.

Of these, the U.S. government accounted for 25% and the private sector for 75%. Of that 75%, for-profit organizations have 35% and the not-for-profit organizations 40%. (Actually, the not-for-profit component in the private sector may be misleading. Increasingly, the designation "not-for-profit" is a convenient organizational means to avoid certain obligations while providing de facto commercial opportunities and benefits to its administrators.)

Categories of Data

One other characteristic of these existing data bases in the U.S. and Europe is worth mentioning. This is the distribution of the bases by category of information held. As shown in Fig. 3, it is striking that the nonscientific and technical category of information in all the reported data bases totaled only 8% of all noncorporate records held, whereas science-technology and science- and technology-related records accounted for 79% of the data held.

One European study, *Information Economics*, edited by Gordon Pratt, suggested that this reflects the "development of publicly available com-

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POWER FOR WHOM? AND FOR WHAT?

IN DEPTH

puter-based information services which has been a spin-off from the massive U.S. government investment in defense and aerospace. These government agencies developed a methodology and technique of information handling to satisfy their own information needs.

"This methodology, updated to capitalize on advances in computer technology, is used by all the major international information services such as System Development Corp. and Lockheed and also the major European operations, the Space Documentation Service of the European Space Agency."

Moreover, much of the assembled data originated in the U.S. military and military-related research and development after World War II. The enormous R&D budgets of the Pentagon, over three decades, have generated a good share of the information that currently resides in data bases.

The Question of Control

Although the rapid evolution of computer technology and control prevents rigid predictions, the uninterrupted assemblage of bases into ever larger aggregations of available data in the U.S. cannot be ignored.

A few corporations or corporate subsidiaries have already emerged as significant data base organizers and data suppliers. Lockheed, for example, with its Dialog information retrieval system, contends that it is "the largest and most extensive collection of on-line [interactive] data bases in the world."

At the end of 1975, it was estimated that there were 2,000 organizational users of on-line search services worldwide, of which 32% were commercial, 31% educational, 21% government agencies, 10% nonprofit and 6% other. Of the overall total of users, Lockheed claimed that its customers exceeded 1,000, or more than half of the worldwide use at that time.

In addition to Lockheed, other U.S. firms — System Development Corp., Bibliographic Retrieval Services, Inc., Mead and Informatics, Inc. — actively promote these services. But it must be remembered that these data base search services, however concentrated, handle only a tiny fraction of the current data storage, processing and transmission, the bulk of which are serving the needs of the multinational businesses — especially those involved in banking, air travel and manufacturing.

The control of data bank creation is no trivial mechanical matter. Simon Nora stressed that "data [is] inseparable from [its] organization, [its] mode of storage. In the long run, it is not a question only of the advantage which may be conferred on familiarity with such and such a datum. The knowledge will end up by being modeled, as it always has been, on data stores."

Nora concluded, therefore, that "leaving to others — i.e., to American banks — the responsibility for organizing the 'collective memory,' while being content to dig into it, is equivalent to accepting cultural alienation. Installing data banks thus constitutes an imperative of sovereignty."

Action in Europe

Data base networks, which may become rivals of the U.S. networks, also are being organized in Europe.

The nine West European market economies which comprise the Common Market have set up Euronet. This network will have access to a number of European-organized scientific, industrial and agricultural data bases, as well as the main U.S. bases.

It is, as one researcher noted, "an ambitious program with an excellent group of information specialists who see their major tasks at present as including finding and selecting appropriate data bases, selecting hardware, selecting and expanding software, developing pricing policies, developing

(Continued on In Depth/11)

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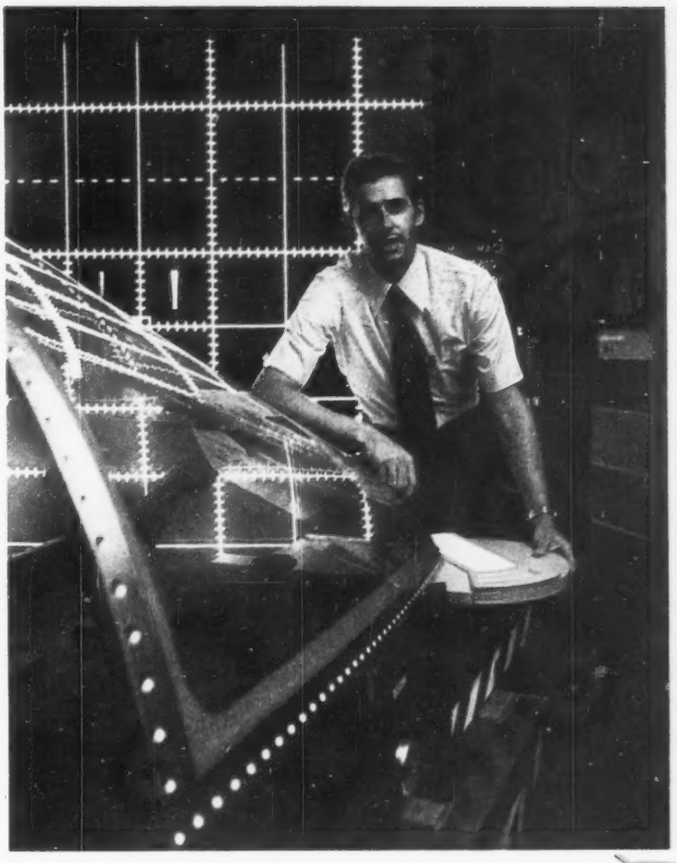

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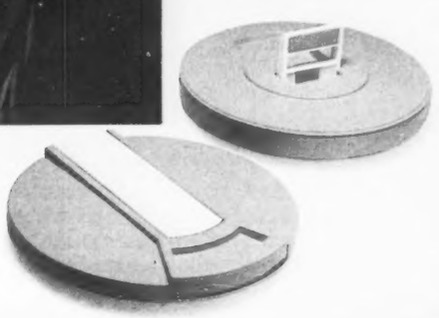

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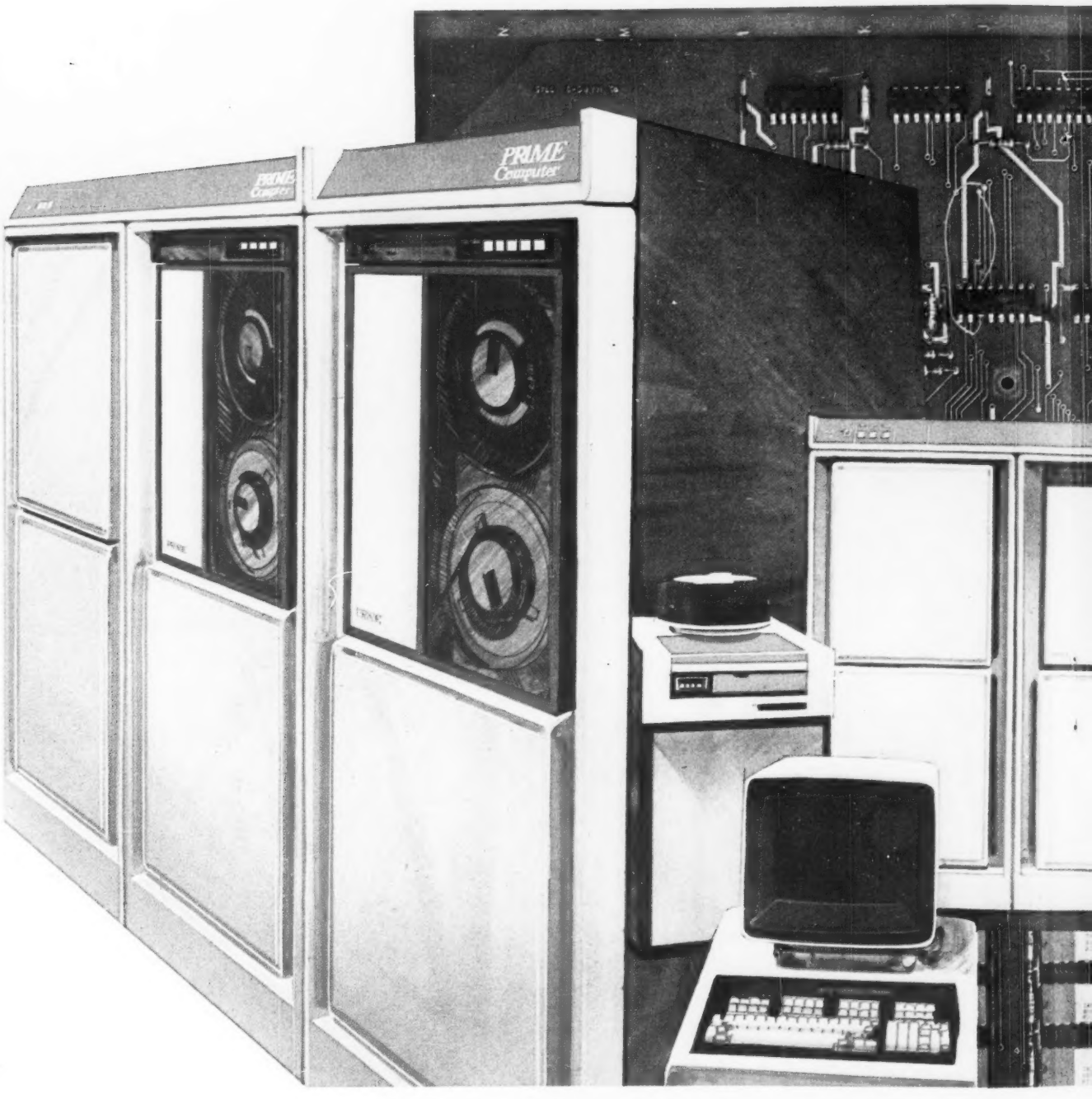

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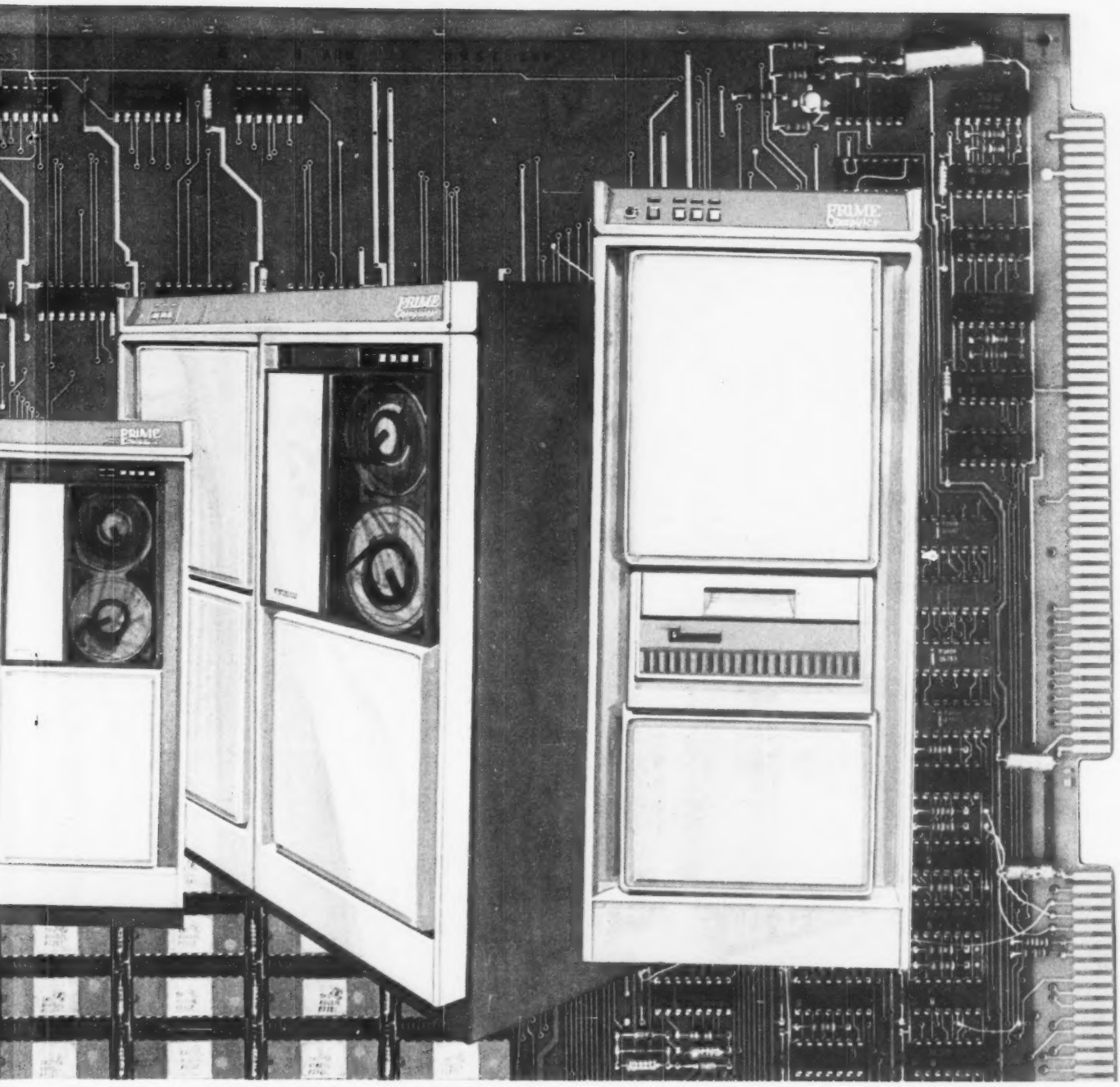

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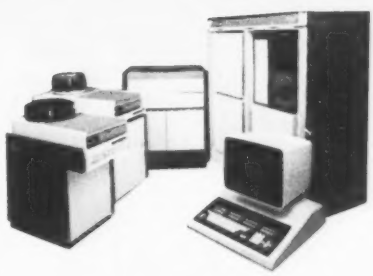

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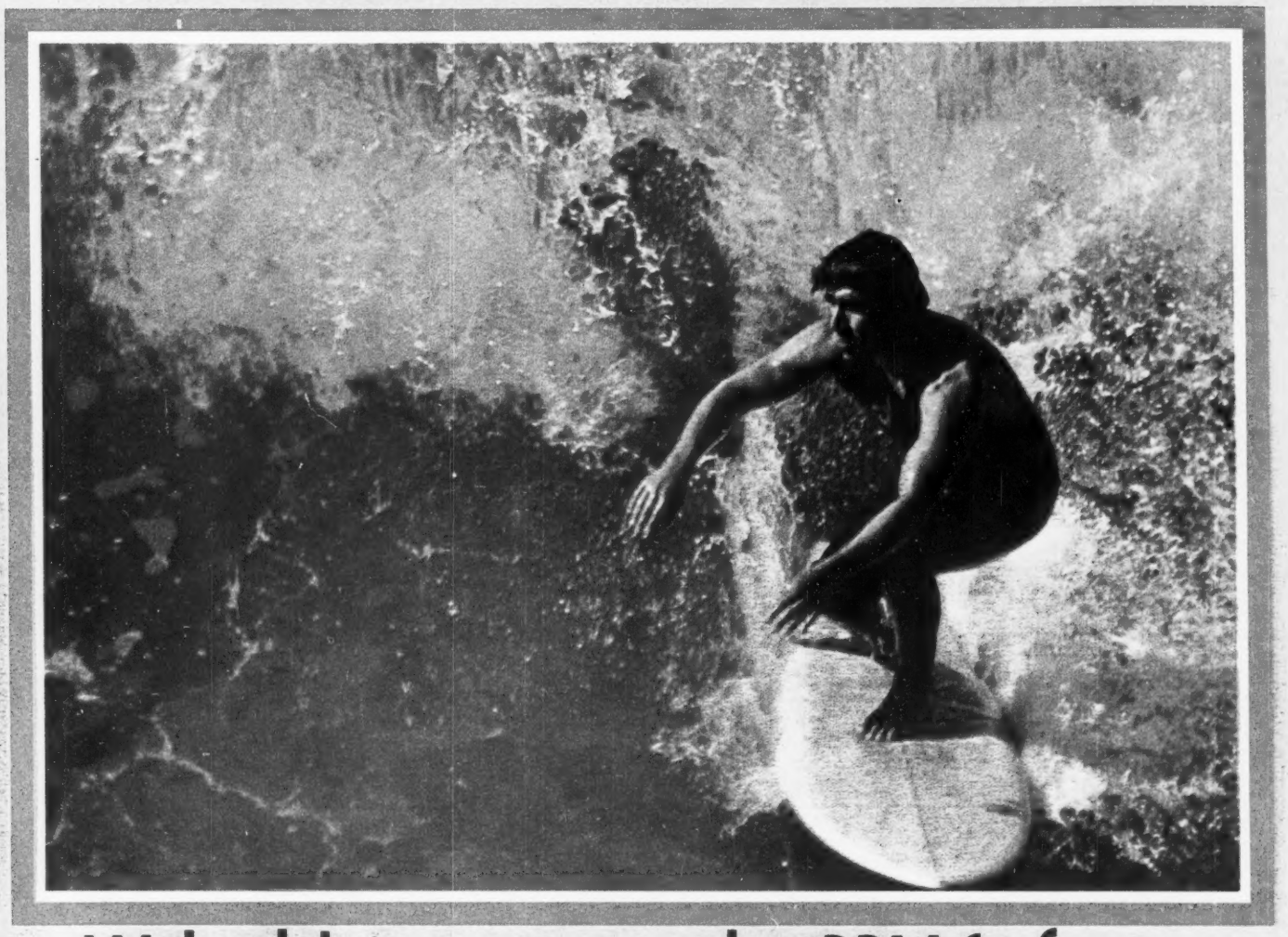

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POWER FOR WHOM? AND FOR WHAT?

IN DEPTH

(Continued from In Depth/7)

improved data bases and working toward [the] filling of gaps, developing multilingual techniques and developing standards."

These mostly technical tasks incident to creating a comprehensive informational network are secondary, however, to the political and economic aims of Euronet, which the same researcher, Melvin J. Voight, sees "as a method of ensuring a system that has European control and is not in the hands of commercial [i.e., U.S.] distributors."

This is no trivial concern. According to U.S. Department of Commerce data for 1975, in the 24 Organization for Economic Cooperation and Development (OECD) European countries, U.S. data processing and information-handling commercial interests showed earnings of nearly $1 billion, growing at 15% to 25% yearly. This sum did *not* include the revenues of general industry (airlines, banks, hotels, U.S. trade associations and automobile manufacturers) also heavily engaged in informational activities.

Europeans, understandably, are considering ways and means of recapturing this business for their own companies. In accord with this objective, OECD called a meeting in Vienna in September 1977 to examine the implications of transborder data flows and to consider whether an international regulatory agreement was necessary.

According to one report, the U.S. "won" at the data flow parley. The victory consisted of the conference's decision not to endorse any international agreement calling for restriction of data transmission across national boundaries.

Since then, in meetings in Torremolinos, Spain (August 1978) and Strasbourg, France (October 1978), U.S. policy has persisted in a strategy of procrastination.

Although U.S. interests have been successful up to now in holding open European data-handling markets, their future prospects remain uncertain. One responsible government official told Congress that "unquestioning acceptance of electronic data processing is ending . . . the possibility of development of nontariff barriers that might effectively exclude or hinder our firms in the European markets [is real]."

More emotionally still, an American businessman in the industry told a congressional committee examining these issues: "We alone are not fully aware that we are at economic war with the rest of the world. We will do our nation a disservice if we don't elevate this discussion."

Transmission Structures

The transmission structures that are being established nationally and internationally provide additional evidence of the character of the systems emerging in the Information Age.

The utilization of data bases, data base networks and private and governmental computerized information systems is ultimately dependent on some form of transmission — telephone, cable, microwave or communications satellites. Communications satellites, which now offer thousands of circuits for telephone and TV and data transmission, are the properties of the same U.S. communications corporations that dominate the computer and telecommunications industries.

A few American companies, such as Hughes Aircraft Co., RCA Corp.'s Astroelectronics Division and General Electric's Space Division, have a hold on the building of communications satellites. A new combinatory enterprise, Satellite Business Systems, a joint venture of subsidiaries of IBM, the Comsat General Corp. and the Aetna Life and Casualty Co., is contracting for the construction of satellites through which it hopes to manage much of the rapidly expanding data transmission requirements of corpo-

(Continued on In Depth/12)

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IN DEPTH

(Continued from In Depth/11)

rate business.

Internationally, Intelsat, the worldwide satellite communications system, remains an instrumentality under comparable U.S. corporate direction, with a few qualifying limitations imposed by the 95 member nations. Both nationally and internationally, the administrative, organizational and technical features of satellite transmission tend to strengthen the world business system, while the pricing patterns, market efficiency, equipment monopoly and the technical determinants of the system are important factors in consolidating old market patterns in a new sector.

Unaddressed Issue

To date, when the far-ranging implications of satellite communications systems have been noticed at all, public discussion has focused mostly on technical questions of access, comprehensiveness, language translation and costs. It seems, however, that an overriding issue remains unaddressed: Do the instantaneous and world-girdling information networks and systems now being installed have either the design, the capability or, with respect to their administrators, the intention of assisting people and nations to overcome cultural and economic impoverishment?

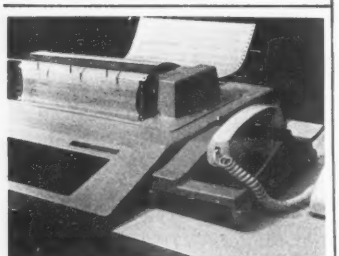
This matter requires and deserves full and open discussion and the most careful consideration by the community at large, not "technical experts" alone. If the capabilities that now are being developed are used for purposes and in ways no different from the communications facilities that preceded them, an enormous opportunity to redress some of the global informational and societal imbalances will be missed.

To be sure, optimistic appraisals of the new computer communication abound. The advantages to mankind of progress in international communications are extensively detailed.

It will, Ithiel de Sola Pool contended in "International Aspects of Computer Communications" (*Telecommunications Policy*, December 1976): (a) increase the economy in world resource utilization; (b) accelerate technical progress overall; (c) meet the special information needs of the less developed countries; (d) facilitate and expand world trade; and (e) facilitate the diversification of world culture.

These attractive prospects are contingent, however, on conditions and assumptions that make it much more likely that the benefits of the new technology will continue to be unequally distributed and the dependency of countries and classes within countries will be extended, not diminished.

Evaluations of the oncoming Information Age that dwell on the splendors of the technological features — while remaining silent about the sociostructural components *already manifest* in equipment manufacture and supply, data base construction and availability and transmission systems created — at best can be regarded with skepticism. These evaluations are inclined to place emphasis and trust on system-determined technology that is not neutral to overcome socio-



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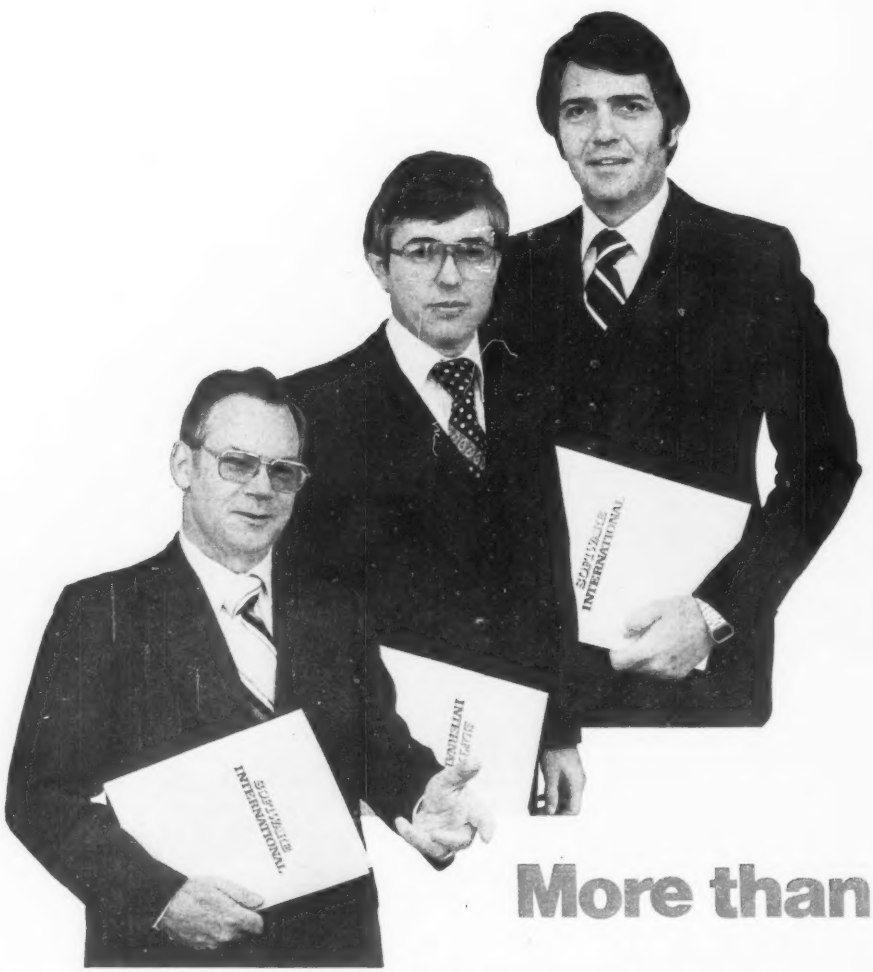

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POWER FOR WHOM? AND FOR WHAT?

IN DEPTH

economic deprivation, which is also systemically created.

The dangers were well assessed by Canada's Minister of State for Science and Technology, J. Hugh Faulkner, who observed that the problem of transnational data flow has "created the potential of growing dependence, rather than interdependence," and with it "the danger of loss of legitimate access to vital information and the danger that industrial and social development will largely be governed by the decisions of interest groups residing in another country."

An example of this type of information flow was noted in a recent annual report of the Harvard Program on Information Resources Policy: "Internationally, political borders are as fuzzy as the computer/communications borders. Balkan Bulgarian Airlines, Malev Hungarian Airlines and LOT Polish Airlines, among others, book *local* flights through a computer in Atlanta. Canadian plant payrolls are made up in St. Louis. An American-built satellite is broadcasting directly to villages in India. Whose information resources are these? Who controls them? With what means? In whose national interests?"

These are pertinent questions.

For the present at least, the U.S. lead in the communications technology is substantial. Recognizing this advantage, American policymakers and economic leaders have pressed for the introduction and utilization of the new technology believing, reasonably enough, that its adoption would be in their benefit.

"Operationalism" — the policy of installing and operating the equipment first and considering its regulation and social impact later — has been the American approach in forums concerned with economic development and international communications. In promoting "operationalism," the U.S. representatives argue that "premature" regulation of direct satellite broadcasting, for example, might hamper its development and delay technical progress.

Similarly with computer communications and transnational border data flows, the U.S. position is that "any international accord calling for restriction of data transmission across national boundaries, whether for reasons of protecting individual privacy or otherwise, [is] either unnecessary or premature" [CW, Aug. 15, 1977].

Uncertain Future

Powerful forces of economics, finance and technology notwithstanding, the future of the Information Age cannot, at this time, be regarded as predetermined and settled.

For one thing, most of the relationships detailed above, however monopolistic and market-oriented, are still in their early growth stage. The rate of technical change remains rapid and, although this is by no means a guarantee of satisfactory outcomes, it does prevent patterns of control from being frozen.

Each generation of technical equipment, for example, far exceeds the capability of its predecessor. New models make existing facilities and processes obsolete. In such a period, stability and control are difficult to achieve, much less maintain.

There is increasing restiveness and growing awareness of people and leaders in many of the underdeveloped nations about the conditions of their economic and cultural dependency. Where do computer communications fit into this picture?

Even at this relatively early stage of utilization of computer communications globally, some disturbing tendencies are observable. Elite classes in the less developed countries are being tied more closely to their decision-making counterparts in the industrialized states. The new communications technology, rather than diminishing, seems

(Continued on In Depth/14)

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IN DEPTH

(Continued from In Depth/13)
to be widening the communications gaps *inside* the poorer nations and accentuating economic disparities between classes.

With a few notable exceptions, the evidence is slight that much rethinking about what constitutes "development" has occurred in the developed world, or anywhere else for that matter. Yet the expectations of repeating Western developmental experiences and achieving Western levels of "mass affluence" in Asia, Africa, the Middle East and Latin America are chimerical. Advanced, industrialized market economies are already coming to recognize that the present levels of resource utilization are not maintainable.

Yet the most casual examination of computer communications reveals that its origins, development and utilization have been tied directly to the structure, character and functioning of a market-organized socioeconomic system. The director of the Science Information Division of the National Science Foundation explained it this way: "The driving forces that are shaping the U.S. information economy . . . are derived from the dynamics of the major elements comprising the U.S. information economy. Information processing requirements of business, banking and other commercial enterprises are immense. So are those of the military and civilian side of the federal government."

The necessity for data processing grew and grows out of the kind of production and service activities that are undertaken. It regularizes the division of labor into technicians and workers in accordance with the control design of the system. It routinizes the organized (state) systems required to maintain social order, domestically and internationally.

Thus, it is reasonable to conclude that a considerable portion of systems and human accounting, individual and corporate, *in the present kind of economy,* can be facilitated enormously with the computer communications now available. But it is no less reasonable to believe that a very significant part of what is now regarded as vital recordkeeping, requiring vast amounts of information processing, could be dispensed with entirely in a community with different social objectives and different underlying social structures and practices.

One may agree that computer communications are of potential benefit in *any* social system. The assumption that they are necessary and urgent as they are currently functioning is another matter entirely. To believe they are is to accept a developmental pattern that already has demonstrated that it is dysfunctional for the satisfaction of elemental human needs.

Herbert I. Schiller is professor of communications at Hunter College of the City University of New York.

Schiller's last book was Communication and Cultural Domination. *He is the co-editor, with K. Nordenstreng, of* National Sovereignty and International Communication.

Schiller received an M.A. in economics from Columbia University and a Ph.D. in economics from New York University.

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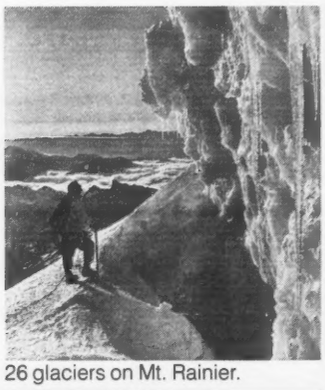
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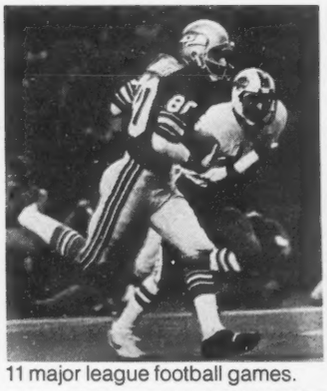
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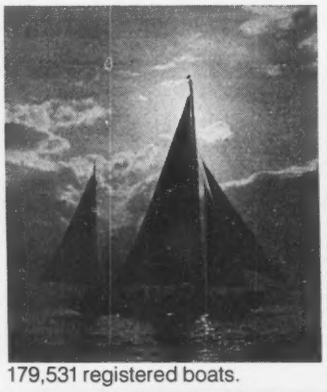
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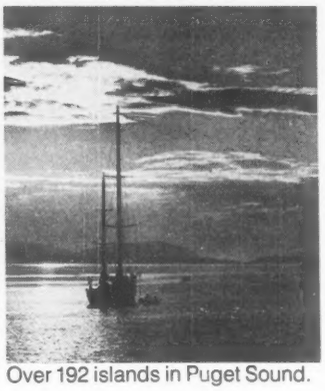
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To Ensure Continuous Operation

Shop Goes Double on People and Gear

By Howard A. Karten
CW Staff

NEWPORT BEACH, Calif. — William H. Gillinger Jr. hasn't yet hired any sets of twins to work for him. But he's working on it.

Gillinger, DP director for WTC, Inc. here, is responsible for the DP operations of the worldwide freight forwarder. Redundancy is one of his major concerns.

"We have to be on-line with something at all times, so we're fully redundant in all areas. We have redundant CPUs, disk and tape controllers — we even try to have redundant people," Gillinger stated, only half kidding.

"Our maintenance and development teams work under a system that assures there are two people involved in every aspect of maintenance and program development. This ensures that we don't end up with two or three people who are indispensable," he explained.

WTC accepts merchandise from shippers, delivers it to common carriers, picks it up at freight terminals and delivers it to the final recipient — sometimes within eight or nine hours of manufacture, Gillinger said.

Since pilferage of goods seems to be at least partly a function of how long they "sit around," rapid delivery is a significant part of reducing theft.

To maintain that schedule, WTC relies heavily on its Univac gear. The equipment includes a Univac 1100/12 multiprocessor with 562K words of memory, 10 Univac 8430 disk drives, tape drives, controllers and front-end equipment. An uninterruptible power supply (UPS) provides backup.

"We have instituted a number of preventive maintenance programs that have anticipated problems and have been able to flush out unreliable or marginal equipment.

"Also, the company had the foresight to do things like provide a UPS. We had some major storms out here last year that knocked out everyone in the area and fried a lot of memory boards — but we just kept right on chunking along," Gillinger recalled.

(Continued on Page 86)

Switches Mainframe Vendors

User Happy Expectations Not Met

MILWAUKEE — A recent convert to Amdahl Corp. mainframes here has found that the performance of Amdahl's engineers doesn't match his expectations. And Charles Graham, the man who changed systems, couldn't be happier over the situation.

Amdahl indicated its people would be able to help with more than the mainframe, but "you figure that's just part of the sales talk, so you don't rely on it," according to Graham, who is DP director for Mortgage Guaranty Insurance Corp. (MGIC). "Still, that's just what happened — not only has Amdahl been willing to help with mainframe problems, but in other areas as well, such as [resolving problems] with our power supply unit.

"They got us a motor generator unit when we had problems with ours, things like that," Graham said.

MGIC, one of the largest private mortgage insurance companies in the country, recently replaced its IBM 370/148 with an Amdahl 470V/5. In doing so, the company saved money, brought in a system sooner than IBM would have been able to supply one and improved its response time, Graham said.

"The Amdahl has decreased our on-line terminal response time from 20 to 6 sec. The end result is significantly faster throughput," Graham remarked.

A major function of the firm is to provide insurance for down payment loans issued through savings and loan associations, banks and other institutions. MGIC began to look for a larger system because "with our growth rate, we simply had more work to do than our mainframe could handle within the ordinary business week.

"The slightest hardware or software problem would slow everything down," Graham explained. "We were getting further and further behind in our schedules, and we had to work Sundays to minimize lateness. Moreover, we had limited resources to bring up new applications."

Many standard financial applications, including general ledger and accounts payable, support the company's activities. But the most crucial application, the one in which throughput speed is a major consideration, is the firm's on-line loan insurance system. Using a computer-based matrix calculation to assist in the underwriting decision, this system approves or rejects loan insurance applications from lending institutions.

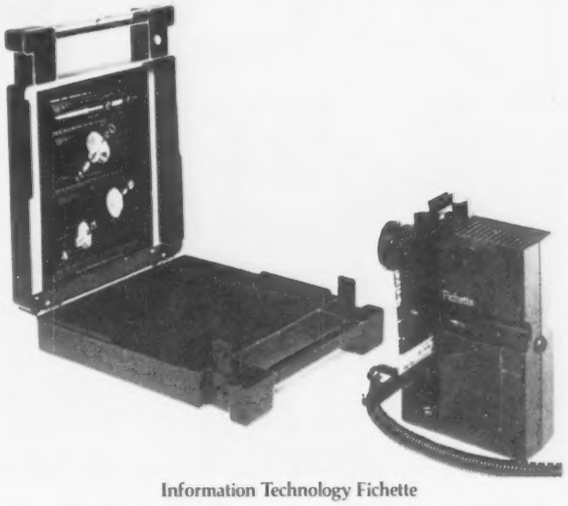
Enough Processing Capacity

The decision to install the Amdahl mainframe was made in late June last year. The system was installed in August.

"We decided on the Amdahl for several reasons," Graham said. "We could have gone to a 370/158, but we would have been at 100% utilization within a couple of years.

"What we needed was a computer that would give us sufficient processing capacity for the

(Continued on Page 88)



Information Technology Fichette

Portable Fiche Reader Bows

NEWTON, Mass. — A portable microfiche reader that weighs three pounds can deliver crisp images in normal office lighting environments, according to its vendor, Information Technology, Inc.

The fichette is a two-part unit. It consists of a projector and an approximately page-sized screen.

This projector can accommodate all flat-film formats, a spokesman said. It holds jacketed source documents, aperture cards, 110mm jacketed film and computer output microfilm in magnifications of 24X and 42/48X. A cassette format that incorporates eight ft of 105mm microfilm is also available.

The fichette costs $149; quantity discounts are available, the vendor said from 154 Wells Ave., Newton, Mass. 02159.

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Whether Distributed or Centralized

Efficiency Seen Most Important in Data Entry

By Jay Woodruff
CW Staff

CAMBRIDGE, Mass. — The decision to distribute or centralize data entry rests on the individual requirements of each organization, but efficiency and high performance should be the watchwords in either case, according to speakers at a regional meeting of the Data Entry Management Association here recently.

James F. Rutter, who heads the Pennsylvania Department of Revenue's Data Reduction Bureau, said centralization of the bureau came as part of a move to improve the throughput of its mainframe. At the same time, department planners were able to make changes in the way personnel and workloads were handled.

The department, which processes more than six million annual tax returns, two million corporate tax returns and 1.6 million sales tax returns, utilizes a group of minicomputers for data input to the department's IBM 370/168 data base-oriented mainframe.

Workload Realigned

It was necessary to realign the workload and personnel when centralization occurred. "We found, for instance, that two tax systems which were operating on one CPU required such heavy program control and background editing" that the system slowed down, Rutter recalled.

"By moving one of these systems to another which had a high volume but little background work, we quickly eliminated the problem," he said.

Cliques Broken Up

Operators were evenly divided according to their skill, so each data entry group could receive an equal workload. "At the same time, we used this reorganization to break up cliques that were talking or socializing excessively," Rutter said. Although the initial shock of the change reduced productivity for a short time, the final result was greater overall productivity, the bureau director observed.

Finally, supervisors were cross-trained in areas of data entry production other than their own, ensuring backup for vacations and sick leave. This also ensured that "at least one strong supervisor or assistant supervisor would be on each system," Rutter explained.

Reducing Personnel

To reduce the need to hire more operators, the bureau has studied the possibility of using a scanning system to reduce the amount of material that must be entered by operators.

"Eighty percent of our budget is in personnel. Even if we get as much as 50% to 60% of handwritten material entered on the scanner and an operator enters the rest, that is still 50% to 60% that doesn't have to be entered by the operators," Rutter pointed out.

Not a Cure-All

On the other hand, those data entry managers who would like to move to distributed processing systems should not sit around waiting for it as the cure-all to reduce costs and increase effectiveness, Fred S. Golove, product administrator of IBM's Data Processing Division, said.

Managers should consider what is needed to get the most out of their systems now, he said, adding that few managers appear to be putting together short-range data entry plans to improve the performance of their departments.

The first question to answer on the way to efficient data entry is "What is the total cost of my current data entry operation?" Golove maintained. "If you can't answer that quickly, you're not really doing all you should be doing as a professional."

Ways to Cut Costs

A number of steps can be taken to lower transcriptive data entry system costs, he indicated. Eliminating tape and going directly from key-to-disk to computer disk files would save labor and equipment costs. Systemized data entry, including automatic insertion and editing, would reduce the number of keystrokes needed to enter and verify documents, he said.

While he agreed that employers concentrate on reducing personnel costs because they are the largest part of data entry budgets, Golove recommended that equipment and supply costs also be considered.

"Most people are off that kick because equipment is cheaper than people now, but it should not be ignored," he suggested.

Commitment Needed

To make these and other changes, managers must make a professional commitment to refocus business and departmental objectives and to get savings.

Successful short-range planning is the best kind of preparation for the eventual move into distributed data processing, he said.

"You have to do both long-range and short-range planning. If you're not making short-range plans, you're not doing all you can to reduce data entry costs."

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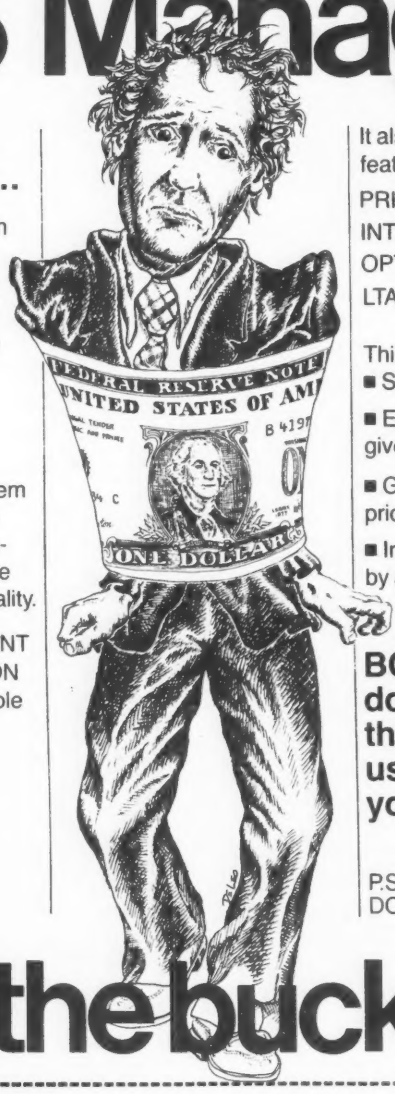

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Drops in Disk Drive Prices Likely to Continue

By a CW Staff Writer

CORONA DEL MAR, Calif. — The steady downward trend in the cost of moving-head disk storage methods should continue indefinitely even though no foreseeable technology is likely to replace those methods, according to a copyrighted story in the December edition of *Computer and Data Processor Technology.*

Despite recent advances, particularly in so-called "solid-state disks" and in increased densities, there is no real competitive technology in sight that will replace commonly available disk drives in the 10M-byte to 10G-byte range. The trend toward increases in bit densities and track densities will probably continue, the report noted.

Industry experts are predicting recording densities of 30 million to 50 million bit/sq in. by the mid-1980s and OEM prices in the area of .0001 cent/bit by that time.

Cost, Performance Trends

Despite an apparent slowdown in progress using present-day design techniques, developments in heads, recording media and new coding techniques will advance trends in cost and in performance, according to the report.

The bit capacity per unit area of media is expected to double by 1981 and again by 1984, the report stated. During that period, the cost should remain constant (in 1978 dollars).

Additional advances in design and technology will also tend to lower user costs for small and medium-capacity units.

Developments in six areas in particular will contribute heavily to both performance improvements and price/-performance ratios on disks. Those areas are the rotating mechanism; the head-positioning mechanism; disks and media surfaces; heads; read, write and encoding electronics; and control electronics.

A trend toward 8-in. disks rather than the somewhat standard 14-in. disks will mean that higher rotational speeds will be possible, which in turn will lead to improvements in access time and higher data rates, the report forecast.

In the area of head-positioning mechanisms, the current voice coil actuator that is used to move the read/write heads to the appropriate spot will undergo evolutionary improvements, but not radical change, the report said.

However, in order to improve performance and time manufacturers might turn to multiple positioners on the same drive or an increase in the number of heads per surface.

Two types of improvements can be anticipated in the actual recording media, the report stated. Higher quality metal substrates will permit better head-to-disk spacing, which will have a significant impact on recording densities.

The magnetic oxide coating used on the platter will also improve, but will eventually be supplanted by actual metal recording surfaces — that is, plated platters. The resulting decrease in the thickness of the magnetic surface will be a big help in achieving better densities, according to the report.

The next major improvement in the disk head will be in physically smaller, "thin-film" heads. This type of head — which is expected to be introduced in the next year — will permit higher frequencies to be used on disks.

Closely associated with increases in the read/write head and the signal it processes are the electronics that back it up. "LSI technology, and in particular microprocessors, will play a major role in providing the low-cost logic necessary for more sophisticated encoding techniques," the report predicted.

That improved electronic capability will enable the disk drive as a whole to tolerate small defects through the use of error correction and to identify and skip over larger defects. This chip technology will also show up in the servomechanisms used to position the heads.

IBM's Role

"Although there has been much argument over whether IBM has been a technological

(Continued on Page 82)

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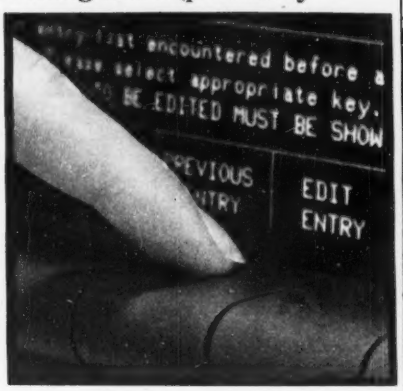

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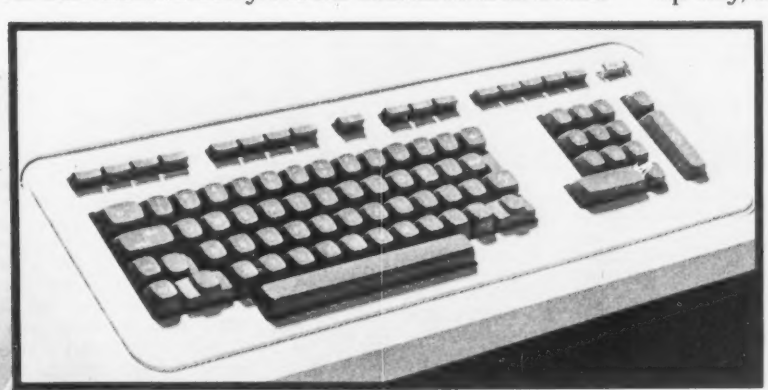

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Insists on Equipment Tryouts

Manager Characterizes His Shop as 'Heinz 57'

By a CW Staff Writer

SPRINGFIELD, Ill. — Jim Cranwill compares his DP operation in some ways to Heinz foods: "I call my shop 'Heinz 57' — I'll use any hardware that's best for the company. We have a wide mix of equipment from IBM, Data 100 Corp. and Memorex Corp., among others."

Cranwill, DP manager for Franklin Life Insurance Co. here, recently replaced some 1,600 bit/in. IBM tape drives with Memorex 3228 tape drives operating at 6,250 bit/in. He realized two immediate improvements as a result, he said. First, tape read/write errors dropped by 86%. Secondly, he saved money.

How much did he save? "A ton," he said, declining to name the specific amount.

Franklin is a nationwide insurance company with some $12 billion worth of insurance in force. A significant part of its DP operation is devoted to updating daily its 1,175,000 policies.

Information about those policies was formerly held on a 25-reel tape file. By switching to the higher density tapes, however, the company reduced that file to seven reels.

Proof's in the Pudding

Cranwill takes a pragmatic approach to equipment selection, he said. "My agreement with a vendor, no matter who I do business with, is that I bring the equipment in for 30 days and try it. If I'm not satisfied with the equipment, I pay the freight in and out and send the gear back. That's the way I do business on anything I buy here.

"If a vendor is confident of its hardware, it will put the hardware in here. If it's not confident, it won't. It's as simple as that," the DP manager said.

The Memorex tape drives, which are connected to the company's 1.5M-byte IBM 370/155 mainframe, are only some of the Memorex peripherals the company uses. The other gear includes Memorex 3360 (IBM 2314-type) disk drives and Memorex 3675 dual-density (IBM 3330-type) drives. More 3675's are on order.

"I've been using Memorex hardware for five or six years, and Memorex gives us excellent service," the informal, confident-sounding Cranwill noted, adding that the service on the company's tape drives is similarly excellent.

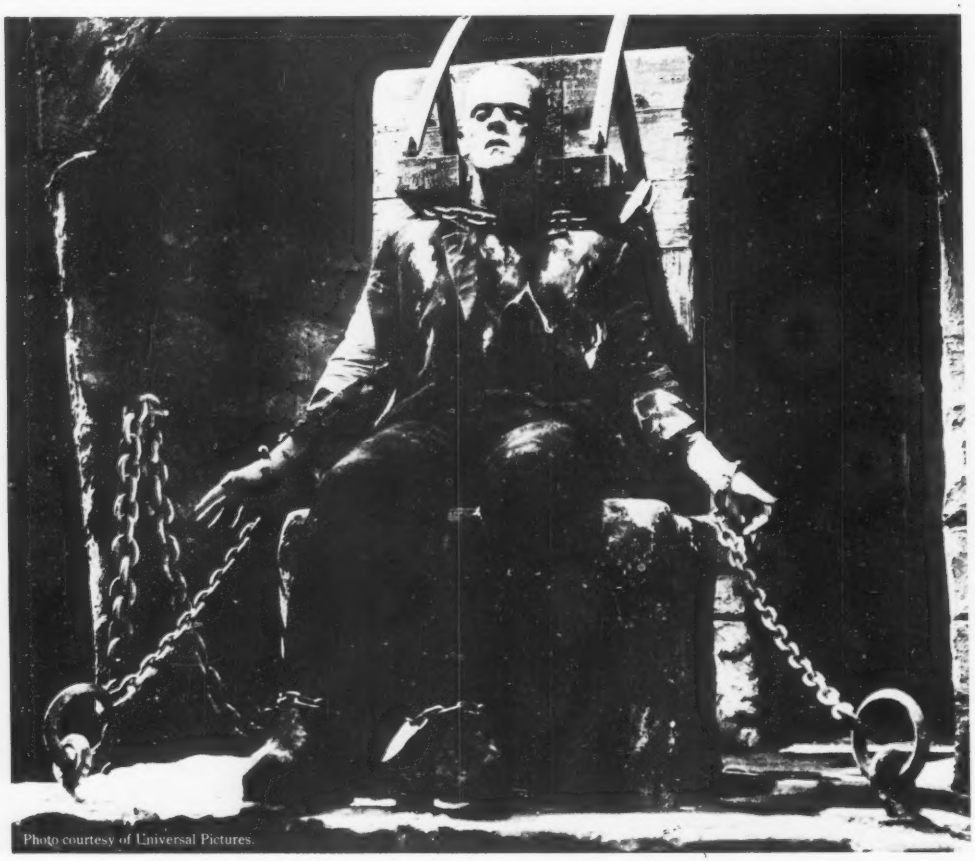
Lower Throwaway Rate

The savings Franklin is realizing come not only from shorter files and faster operations. "We had been throwing about 33% of our tapes away because we thought there was something wrong with them when they were used on the old drives. Now our throwaway rate is less than 10% to 12%," he said.

The company initially considered updating the older drives when the need for faster tape operations became apparent. "But when the Memorex drives were announced, I went out to the factory and looked at the plant and at the drives. I saw the drives run and, based on how they functioned out there and on the uptime reports Memorex had compiled, I liked what I saw, Cranwill said.

"We were looking for tape drives that would provide information faster with fewer errors. After seeing the drives in action, I felt they were what we needed."

Cranwill's approach to equipment selection is only part of the reason for his shop's success, however. "I have the best operation because I have the best people," he concluded.



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CalComp mini-peripherals: Because who knows what evil lurks?

Report Predicts Disk Price Drop

(Continued from Page 79)

leader in the industry, there is little doubt that it has been the technological leader in disk storage developments," the report noted.

Other companies have contributed to disk drive technology, but the history of the major disk drive advances can be summarized by the introduction of the IBM Ramac system in 1956, the IBM 1311 3M-byte disk drive in 1963 and other intermediate disks, culminating in IBM's 1975 introduction of the 300M-byte 3350, the report continued.

Those storage capacities have been augmented by other disk drive manufacturers, which have further expanded on the efforts made by IBM. "This was particularly true in the small-capacity, low-cost drives introduced by Diablo Systems, Inc. and the dual-density versions of the IBM 2314, IBM 3330 and, more recently, IBM 3350 disk drives offered by several independent suppliers," according to the report.

However, the most important part played by independents in all this may well have been in reducing the cost of the drives, thereby making up-to-date technology and drives available to other manufacturers, particularly minicomputer vendors, the report said.

Computer and Data Processor Technology is published monthly and is available for $85 a year from Hobbs Associates, Inc., P.O. Box 686, Corona Del Mar, Calif. 92625.

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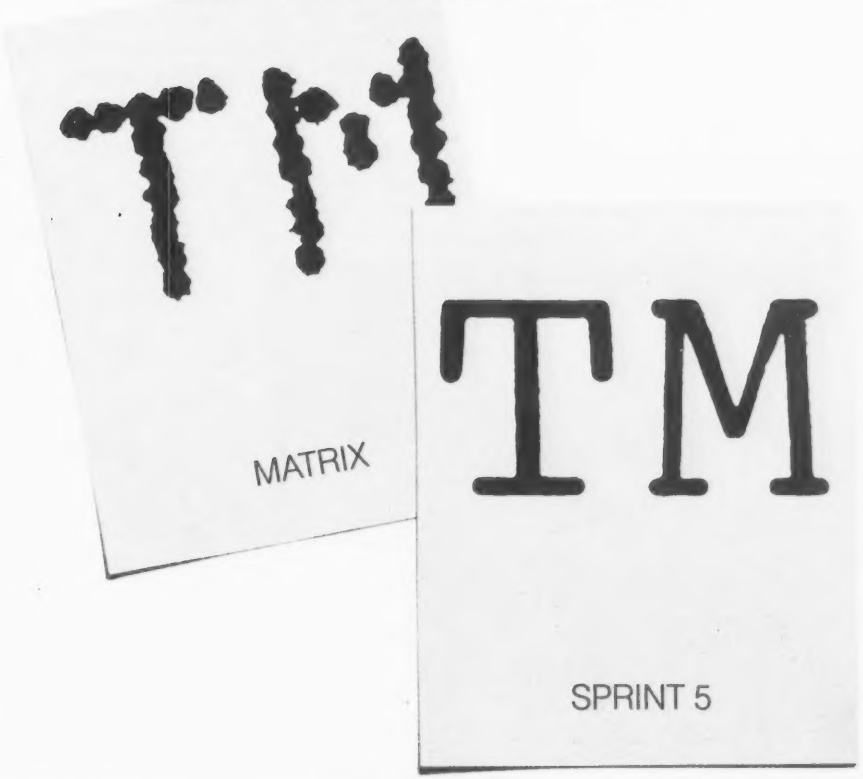

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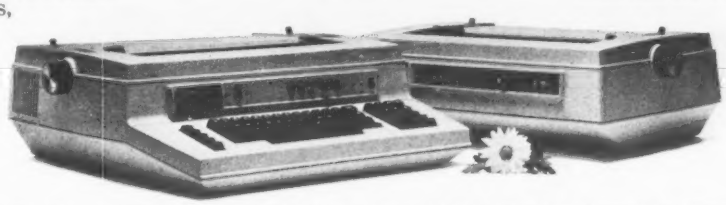

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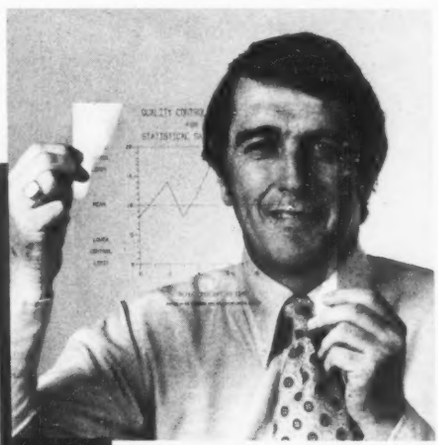

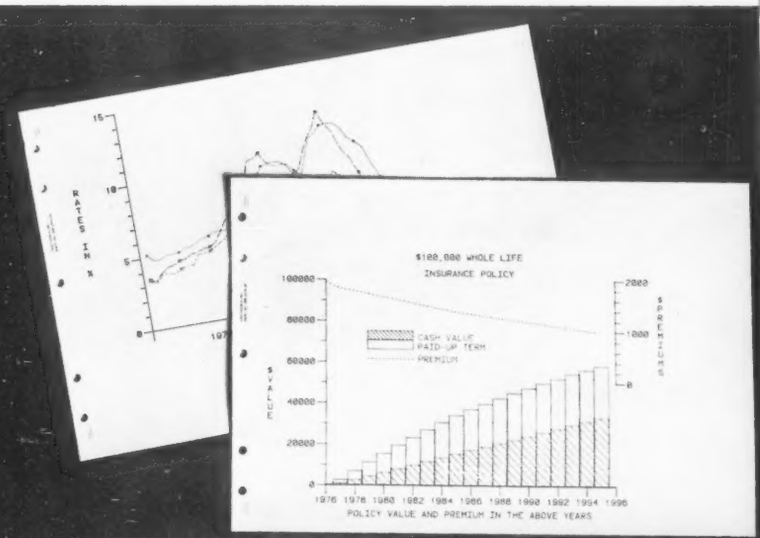

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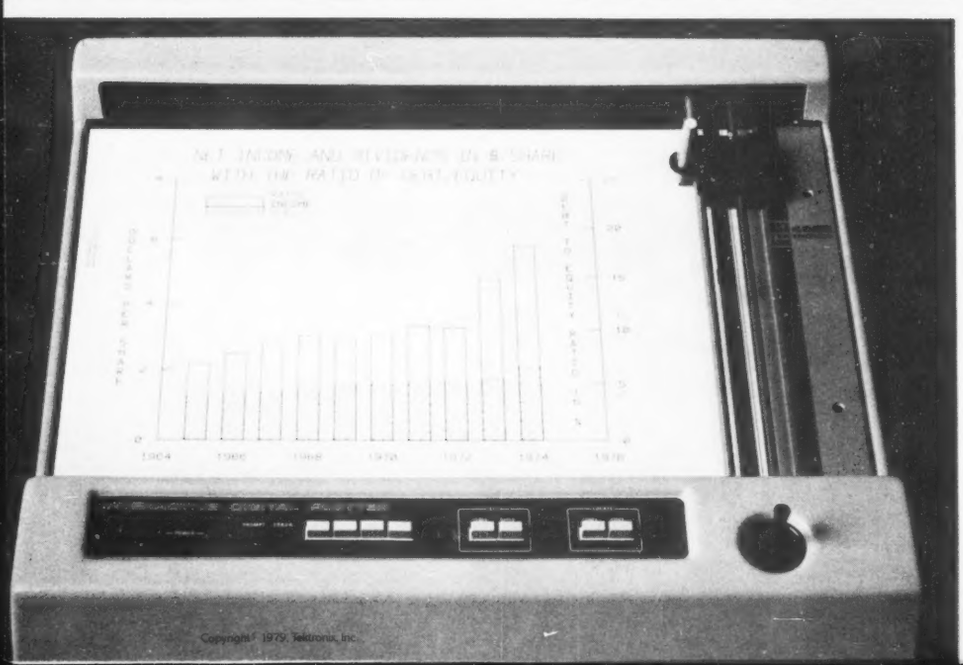

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College Adds Disk, Learns About Students

BAYSIDE, N.Y. — As part of its drive toward a "total computerized administration system," Queensborough Community College, part of the City University of New York (Cuny) here, recently installed six spindles of disk storage from an independent vendor on its IBM mainframe.

The 1.9G-byte disk storage system is the heart of the college's administrative DP center and part of "the most extensive student information system on the eastern seaboard," according to George C. Goulandris, DP director at the college.

"The Memorex Corp. 3650 system has more than quadrupled our disk capacity, decreased the amount of space needed for the drives and sped up disk processing by a 3:1 factor," he explained. "This improved performance has greatly increased the efficiency of our operations."

Since 1973, the college has been developing a comprehensive "cradle-to-grave" student data base system. This system now includes a point-of-sales bursaring system, an inventory system, an alumni system and an hourly payroll system.

A number of departments — including admissions, registration, course scheduling, accounting, student testing and DP — can access the data through on-campus terminals.

Sea of Changes

The disk system was installed last year, at the same time the DP center was converting from a 360/30 to a 370/138 under DOS/VS. It replaced nine IBM 2314 and 11 Memorex 660 disk drives. Along with these changes, the center itself was moved and file organization was changed from Isam to Vsam.

"Since the center could not afford parallel processing for the length of the changeover period, it was a matter of 'sink or swim,'" according to Goulandris.

Despite all these simultaneous changes, the switch took place without problems, requiring a shutdown of only three working days.

The center's current system consists of the 1M-byte 370/138, five tape drives, a Memorex 3653 storage module and controller and two Memorex 3650 direct access storage modules. In addition, 55 terminals, including 10 NCR Corp. point-of-sale terminals, are front-ended by an IBM System/7.

The price/performance ratio of the Memorex drives contributed to Goulandris' decision. "These drives cost 33% less than the IBM drives," he said.

Each drive can transfer data at a rate of 1.2M byte/sec, and a fixed-head option on one of the storage modules speeds up response.

Student Information

With information on many aspects of the students' academic life, the student information data base is a powerful administrative tool for the college.

For example, when a prospective student applies for admission, the system evaluates his high school grades and schedules him for possible remedial testing. After testing, if necessary, it places the student in a remedial program.

The registrar uses the computer to process student applications. At the end of a semester, transcripts are generated by the computer within 48 hours after grades are submitted by instructors.

In addition, the computer uses course information in the data base to evaluate a student's progress toward fulfilling his requirements. It determines whether the student's credits are in the proper disciplines for graduation.

After the system evaluates the student's courses and credits, a list of potential graduates is submitted to the Registrar. Except in special cases where human judgment is necessary, the computer-generated list is used in determining who will graduate. Once a student graduates, the computer automatically includes that student in the alumni data base.

A considerable amount of effort has gone into linking the various data bases and files in efficient, effective ways.

When a student signs up for a course, his Social Security Number and the course's name and section are entered through a terminal.

Master File

The computer checks the course master file — organized by semester, course, section, meeting time, instructor and other information that changes each semester — and spots any conflicts in the student's schedule.

The course master file is linked to the course description file, which contains permanent information — such as the number of credits — on all the courses that have ever been given at Queensborough.

This course master file is also linked to the personnel data base, which includes the Social Security Numbers and instructors' class schedules. Information in this data base can be used to verify that no conflicts exist in the instructors' schedules.

Goulandris believes that the college's total computerized administration system will be completed within the next two years. Toward this end, the next systems he intends to develop — along with their associated data bases — are the budget, costing and pourchasing systems.

To achieve this goal, his plans call for additional disk storage.

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A-Frame Decollator Spools Carbons From DP Printouts

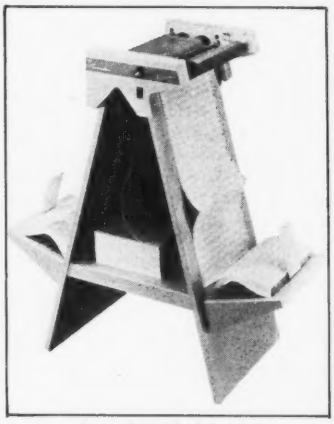
LONG ISLAND CITY, N.Y. — The Swingline Co. has introduced the latest in its line of office equipment intended for computer applications, the Model 6325 A-frame decollator.

The unit accommodates continuous, standard two-part forms including the original, the carbon and the copy and separates them, spooling the carbon so that it can be discarded neatly.

The unit pulls forms from a box in the bottom of the A-frame up to rollers that separate the forms. After separation, the paper falls into receptacles on each side.

Forms with three or more parts must be run through twice. Unlike most collators, the 6325 can accommodate carbonless forms, according to a company spokesman.

The Model 6325 costs $649, while the tabletop version — which requires carbon — sells for $349. Swingline can be reached at 32-00 Skillman Ave., Long Island City, N.Y. 11101.



Swingline Model 6325

User Installs Redundancy For Both People and Gear

(Continued from Page 77)

Terry Marsh, technical services manager for the company, explained some of the preventive maintenance measures. "We manually go through the Logrec records and determine what equipment is not operating up to par. We have set our own standards, and if we have a device that's really giving us problems and we're really unsatisfied with the response, we may ask for a field swap on the unit."

That has happened only once, he indicated, but the company has thought out its alternatives.

Other methods include a weekly, in-depth meeting with Univac customer engineers and software support people to discuss any unusual incidents.

WTC also puts a strong emphasis on cleanliness within the computer room. "We keep the area almost immaculate, making sure there isn't a lot of paper stacked up, for example, which generates a lot of lint and dust. The tape and disk libraries are kept cased and protected, and our operators cooperate strongly in these efforts," Marsh said.

One Hour Downtime

Since the company began keeping records of its DP performance last year, the longest all the equipment has ever been down at one time is one hour, according to Gillinger. He attributed this performance to the company's relationship with Univac.

"We have made it known to Univac that we cannot suffer any significant downtime," he said. "We have further developed our communications with Univac so that software bugs are sent to Roseville, Minn. [Univac's operating systems support center] and we get four- to five-day turnaround."

WTC was up 99.4% of the time the system was supposed to be on-line in the past year, Gillinger said. He believes three factors contribute heavily to that record: the dedication and competence of the DPers working for him, the company's method of doing business and the support he receives from Univac.

As an example of Univac's responsiveness, the DP director recalled an incident concerning some Univac tape drives. These "toy tape drives," as he termed them, were being made for Univac by a California company, but performed at an unacceptably low level.

"I finally went through one of my famous tirades, and we got a no-cost swap for Univac's U-16 drives, which are very reliable," Gillinger said.

Biggest Challenge

Despite the problems inherent in running a redundant center that must maintain such a high level of uptime, hardware-related problems are not the biggest challenge Gillinger faces. Managing people — attracting them, training them, keeping them, making them productive — "is definitely a bigger problem than managing equipment," he stated.

"A major challenge we face, since we are on a major development project now and we're a totally structured design and programming shop, is finding qualified programmer/analysts who have been trained in structured techniques and who believe in them.

"We've also had trouble in the Los Angeles job market finding programmer/analysts who are qualified and familiar with large-scale Univac equipment.

"We've gone through quite a salary scale adjustment here and, from the salary surveys I've been reading, I estimate we are paying 15% over national and regional salary averages in every position in order to attract a qualified staff. We have been attracting them, but it's very difficult," he said.

'It Still Works Fine If You Only Ask It Questions on Horticulture.'

For System Upgrade

Software Vendor Sticks With Hardware Vendor

By Jay Woodruff
CW Staff

DALLAS — Demands for increasingly sophisticated solutions to several different types of engineering problems led University Computing Co. (UCC) here to replace one of its pair of Control Data Corp. 6600 systems with a more recent Cyber 175.

Before the Cyber 175 replaced one of the 131,000-word 6600s at the end of 1978, the computing center was experiencing a memory shortage, according to Doug Parker, product manager of UCC's Cyber Service Center. The Cyber 175, with 262K words of memory, is expected to enhance the center's ability to provide services to nuclear, structural and piping analysis engineering users.

"Most of our users are engineers who want to solve an engineering problem for a particular project. We furnish the applications tools and structural and nuclear engineers to help do the job," Parker explained.

The Cyber center is one of three facilities run by UCC; the other two provide processing on Univac and IBM systems.

Better Memory Ceiling

The Cyber 175 gives the center "a more reasonable memory ceiling," which allows it to tackle complex problems that had strained the abilities of the older system, Parker said.

For example, the continuing search for oil has led in the last decade to more offshore drilling platforms. This means using computers to design the platforms, taking into account variables like waves, wind and other environmental factors, he explained.

The remaining 6600 shares files and a front end with the newer sysem. Interfacing the two systems was not difficult, Parker said, and multimainframe software makes the 6600 transparent to the 175.

Others Not Considered

UCC did not seriously consider other vendors when it looked into alternatives to the aging 6600. "We were tied into the CDC equipment line, and we didn't want to disrupt it," Parker stated.

"The 175 appeared able to do everything the center needed it to do, and converting to another vendor's product would not have been worth the trouble," he added. "The 175 hardware also appeared to be the most cost-effective."

UCC has been impressed with the 175's performance record in the year and a half since it was introduced, and Parker said its field history was also a consideration in its selection.

The Cyber 175 needed no more air conditioning than was supplied for the 6600, which was twice its size.

The CPU represents the final phase of UCC's effort to provide the most up-to-date services for its customers," Parker continued. "Over the past six to eight months, we have upgraded all our disk storage units, tape units and communications capabilities. Finally, we went from the 6600 to the 175."

The Cyber Center has plans to add additional tape and disk systems to its CDC 844 disks and 9-track tape units.

The 175 was delivered on a Tuesday and turned over to UCC on the following Friday, when its engineers "ran all our old programs to see if they would work on this machine," Parker said. "It ran them all flawlessly, and we put it into production nine days after delivery."

Parker has a very high opinion of the way the installation was handled: "It verified our opinion that this is a very solid piece of hardware." The 6600 had served UCC reliably, and the 175 seems able to continue the tradition, he reported.

CDC bases on-site engineers at the center, from which they are also dispatched to other cities in their service territory. Preventative maintenance is performed once a week, which is an improvement over the daily maintenance needed by the older 6600, Parker said.

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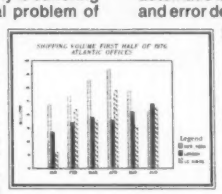

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User Switches Mainframes And Expectations Not Met

(Continued from Page 77)

next five years or so, one that would allow us to grow without an upgrade. After considering the IBM 3031, we found that delivery couldn't be guaranteed until 1980.

"Amdahl would commit itself to meet our delivery requirement, and the computer provided the price/-performance we needed," Graham continued. "It also allowed us to continue using IBM software without any modification."

The installation of the Amdahl 470V/5 went quickly and smoothly, according to Graham. The computer arrived on a Wednesday morning and was powered up by the following morning. Then, off-line testing began.

The peripherals were put on-line about 8 p.m. Friday, and Amdahl turned the system over to MGIC the following day. A two-hour benchmark was run, and the system was ready to handle production.

Minor Problem

"Because the 470V/5 is compatible with MGIC software, our operators had nothing new to learn," Graham noted. "The only hitch was a minor problem, early on Saturday, with the IPL of the OS/VS1 operating system. But Amdahl took care of that problem within an hour or two.

"It turned out that a read/write switch on the 3350 was in read-only. We were extremely pleased with the speed and efficiency of the entire operation," Graham said.

Attached to the 4M-byte system are six Memorex Corp. 3670 disk drives and 10 IBM 3350s. A total of 90 CRTs and 30 hard-copy terminals, running under CICS, are connected to the CPU via five 4,800 bit/sec communications lines.

MGIC's primary on-line system involves loan insurance evaluation and the return of the resulting insurance certificates to MGIC's regional underwriters' offices.

Two Main Data Bases

The system operates with two main data bases. A lender data base contains the various codes used for underwriting and various characteristics about the lenders. A residential data base contains all the information relative to specific policies.

Both data bases are updated daily, and regional offices can access them to obtain customer and certificate status information.

After an MGIC underwriter receives an insurance application from a lender institution and does a preliminary review, the underwriter extracts the appropriate information needed for the evaluation — such as the applicant's financial history, type of dwelling and so forth — and enters it into the system through a CRT.

Using other information at its disposal, such as the lender's history, the system then determines — based on a special algorithm — whether the application meets MGIC's approval standard.

If the application is approved, the information is entered into the residential data base, and a commitment/-certificate is produced on the regional office's printer. The regional office then forwards it to the lender.

If the application is not approved, a rejection notice is flashed on the terminal screen. The underwriter can use the terminal interactively to analyze the specific reason for the rejection and can, if desired, override it.

Then and Now

"With our previous computer and 2,400 bit/sec lines, terminal response time for on-line approval was about 20 sec on the average," Graham said. With the 470 and 4,800 bit/sec lines, terminal response time has been cut to about 6 sec.

"Since we handle approximately 20,000 terminal transactions a week, this reduction in response time means greatly increased efficiency and processing speed," he stated.

Previously, with the 370/148, processing went on six days a week, 24 hours a day, and even then, Graham said, "we had 22% more processing than time would allow."

Currently, with the 470V/5, the company uses the computer only 18 hours a day, five days a week and eight hours on Saturday. The peak volume period for on-line transactions is two hours near mid-day, and the busiest day of the week is Monday.

"The 470V/5 gives us plenty of breathing space," Graham said. "It has greatly improved our batch and on-line capabilities. This means we can add more offices, which of course means more business and better customer relations."

"When necessary, we can easily increase our computer power by 50% by having Amdahl upgrade our system on-site to a 470 V/6-II," he noted.

Editing Station Suits Microfilm

RYE, N.Y. — A portable micrographics editing station introduced by Microply Corp. is said to allow users to edit three different widths of microfilm roll film.

The unit allows quick, easy editing and proofing of 16mm, 35mm and 105mm film, according to a spokesman. An adjustable light box and specially built nonscratch film guides on a portable platform allows the unit to handle film in lengths up to 1,000 ft.

The manually operated Model I station costs $504, while the motorized Model II sells for $994. Microply can be reached through P.O. Box 601, Rye, N.Y. 10580.

Tape Calibrates Gear

SHELTON, Conn. — An alignment reference cassette tape recently introduced by Magnetic Information Systems, Inc. can be used to calibrate digital and word processing equipment, according to the manufacturer.

The cassette is prerecorded at 1,600 flux change/in. (FCI) on an optical alignment recorder employing precision magnetic heads, a spokesman said. The tape used in the cassettes is said to be specially made for digital reference tape applications.

The product costs $12.50, the company said from 415 Howe Ave., Shelton, Conn. 06484.

Cost 15% to 25% Less

Disk Subsystems Replace DEC Units

SUNNYVALE, Calif. — Users of several Digital Equipment Corp. CPU families can obtain disk storage subsystems that are said to be plug-compatible replacements for DEC's RP04, RP05 and RP06 disk drives and cost 15% to 25% less, depending on the quantity ordered.

Microcomputer Systems Corp. (MSC) has introduced the 200M-byte MSC-05 and MSC-06 disk subsystems, which are intended to serve as alternatives to DEC drives on the Decsystem-10, Decsystem-20, PDP-11, PDP-11/70 and VAX-11/780.

The architecture of the MSC subsystems is "fundamentally different" from that of DEC's products, a spokesman said, but performance characteristics are similar because both approaches are based on an industry-standard disk drive prototype.

"The [DEC units] are really a combination of disk drive and disk storage control unit circuitry," the spokesman maintained. "They should be called something else, like 'disk storage units,' to distinguish them from standard disk drives. We have purposely avoided this complex engineering implementation."

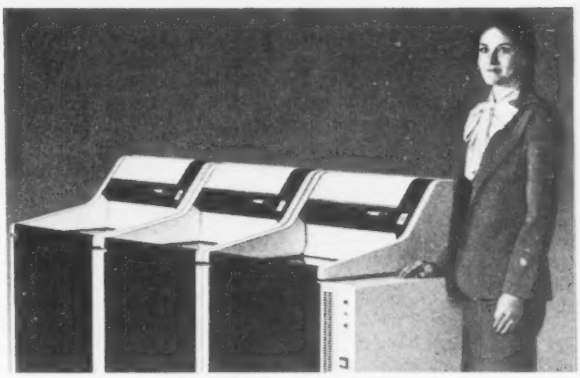
The MSC subsystem can be added to an installation without any changes to its existing operating system, MSC claimed. After the addition is made, disk packs from these drives and from DEC can be interchanged to configure a hybrid system.

Because of its inherent plug-compatibility, the MSC subsystem will remain compatible with a CPU even if the resident operating system is upgraded to utilize more of the capabilities of the DEC Massbus, MSC continued. Users can thus upgrade their systems without obsoleting their disk drive subsystem.

All operating system and device-level diagnostics are fully supported with the MSC alternatives, the spokesman asserted. Furthermore, "extensive" on-line and off-line diagnostics for the subsystems have been implemented, he added.

In addition, the MSC products require "significantly less floor space for the same storage capability and offer significant cost savings," he said.

The MSC-05 and MSC-06 architecture involves centralization of the data transfer management functions. Both the MSC and DEC systems perform the same logical functions, but the MSC units perform them more efficiently, MSC claimed.



MSC Disk Storage Subsystems

However, the vendor said there will be no immediate throughput advantages at most installations choosing to use its drives; a potentially higher throughput was called achievable as control software is upgraded.

A dual-port option on the MSC subsystems permits access by two different CPUs at the same time. The operation of the subsystem in the dual-port mode is functionally transparent to both CPUs, regardless of the number of disk drives attached to the subsystem, according to the spokesman.

This option provides a low-cost implementation of multidrive dual-port capabilities currently not available through DEC, he said. The option supports the Massbus reservation, request and interrupt protocols for all drives in the configuration, he added.

More than one MSC subsystem can be attached to the same Massbus, providing the potential for dual data paths to as many drives as required, the spokesman said. The only restriction on this arrangement is inherent in the Massbus itself: no more than eight disk drives or disk drive units can be attached to a single Massbus, he pointed out.

The MSC-05 and MSC-06 cost about $25,000 each; with a required controller, the subsystems cost $29,000.

MSC is located at 432 Lakeside, Sunnyvale, Calif. 94086.

Built for General-Purpose Use

Micro System Fits on Desktop

SAN LEANDRO, Calif. — A general-purpose desktop microcomputer system designed for small businesses, major corporations and academic and scientific communities has been introduced by Imsai Manufacturing Corp.

The VDP-80 Video Data Processor features an 8085 microprocessor, 32K or 64K bytes of random-access memory (RAM), dual 8-in. floppy disks, a 12-in. CRT, keyboard, 12-key numeric keypad and serial I/O.

The VDP-80 can be used by a small business to process administrative and management data or to perform various bookkeeping tasks such as payroll, inventory and accounts receivable, according to a spokesman. It can also operate as an intelligent terminal for distributed data processing systems or as a station for communicating data to a larger remote DP center, he added.

The unit's floppy disk system consists of a controller and a drive assembly. A dual Persci, Inc., floppy disk drive assembly provides 590K bytes of on-line storage in single density; in double density, on-line disk storage capacity is 1.25M bytes.

The system's interface can support two Persci dual floppy disk drives; the addition of a second drive assembly yields a disk storage capacity up to 2.5M bytes, the spokesman said.

Reportedly performing 50% faster than the 8080, the 8085 microprocessor maintains or improves bus timing margins, the spokesman claimed, thereby reducing critical timing requirements of RAM and other interfaces.

The five-level maskable priority interrupt enables the processor to be used in "sophisticated" interrupt-driven systems without additional interrupt controllers, the spokesman said.

Operating System

The Imsai Multidisk Operating System (Imdos), compatible with CP/M, is included with the VDP-80. Imdos contains over 20 utilities, including an 8085 assembler, peripheral interchange program, a debugging tool, disk and memory diagnostic program and facilities for data management. A scientific Basic language is also provided with Imdos.

Imdos reportedly provides program access to records in sequential and random-access modes; system operating commands can be batched for automatic processing, the spokesman said.

Other software available for the VDP-80 includes an Ansi Level 2

(Continued on Page 94)

Cartridge Puts 34M on 1/4-In. Tape

PASADENA, Calif. — A digital cartridge tape drive with reel-to-reel capacity that stores 34M bytes of information on a 1/4-in. cartridge is available from Data Electronics, Inc. (DEI).

The Microtape stores twice as much data as DEI's Funnel cartridge drive and costs 30% less, the vendor said, claiming that Funnel had been the cartridge tape drive capacity leader.

Microtape's 7-track design supplants the 4-track prototype recognized as the standard 1/4-in. cartridge drive by the American National Standards Institute and the European Computer Manufacturers Association, according to a spokesman.

The unit incorporates group code recording with a bit density of 7,200 bit/in., he added. Recording is serpentine, with adjacent tracks recorded in the opposing direction to eliminate the need for rewind time in moving from one track to another.

The Microtape cartridge drive costs $1,500 in OEM quantities, DEI said from 370 N. Halstead St., Pasadena, Calif. 91107.

Disk Pack Works On Trident Drive

ST. PAUL, Minn. — An 81.4 million-byte disk pack for use on California Computer Products, Inc.'s Trident T80 disk drive is available from the 3M Co.

The Model 947/80 disk pack is unformatted; each pack has 808 data tracks and seven alternates on each of five recording surfaces. A prerecorded servo surface defines track location at 370 track/in., according to a spokesman.

The disks feature 3M's Crashguard protective coating, which resists damage to the disk surface from recording head impacts, he said.

The Model 947/80 weighs 11.5 lbs. and measures 5.5 in. high by 15 in. in diameter. It costs about $400. The vendor can be reached through P.O. Box 33600, St. Paul, Minn. 55133.

Smaller Retailers Offered Mini-Based NCR System

DAYTON, Ohio — A minicomputer system designed for specialty stores and small department stores has been introduced by NCR Corp.

Based on the NCR I-8200 series minicomputer, the Retail Management System (RMS) includes four software applications modules and uses such point-of-sale (POS) terminals as the NCR 250 and NCR 2140 CRT units.

With the system, all sales and merchandise information is recorded on a magnetic tape cassette as the purchase is made; this data is then processed by the store's mini. All other data is entered via the POS terminals, NCR said.

Store managers can also use the terminals to retrieve specific information or to request reports, a spokesman added.

RMS applications modules are sales analysis and inventory, accounts receivable, merchandise accounts payable and general ledger.

Accounting Options

The system can be used for single- or multiple-store operations and offers managers a variety of accounting options. For example, it can operate using department-level, class-level or stock-keeping unit (SKU) inventory-level information.

The RMS can reportedly accommodate either the retail or direct cost method of inventory evaluation.

The system can generate such reports as sales audit, sales analysis, unit inventory, cash requirements, credit exception and comparative financial statements.

The basic RMS configuration includes an I-8230 CPU with 80K bytes of main memory, 10M bytes of disk, a CRT terminal and a line printer. The basic configuration rents for approximately $1,300 per month under a five-year agreement and costs $38,000.

All four applications modules can be purchased for $7,500. The general ledger module alone costs $1,500 and the remaining three modules cost $2,000 each.

The accounts receivable module requires use of the sales analysis and inventory module, NCR added. However, the accounts payable and general ledger programs can function independently.

Free Booklet Tells How to Pick a Vendor

WOODLAND HILLS, Calif. — A free set of procedures for evaluating and selecting vendors of hardware, software and processing services is available from Info III.

The "Vendor Selection Procedure" consists of 40 steps divided into five phases. The procedure starts with defining processing needs and ends with the development of an installation plan, the publisher of DP training courses explained.

The basic approach entails the development of a definitive request for proposal (RFP) document to ensure accurate description of user requirements and to facilitate the comparison of vendor proposals, Info III said.

The five phases in the procedure are defining present processing needs; preparing and releasing the RFP; evaluating and selecting a vendor; negotiating the contract; and making an installation plan.

The procedures are derived from Info III's *Computer Concepts for Small Business*, which, according to the publisher, presents the fundamentals of DP in the small business environment.

This "learner-paced" course includes audio-cassette tapes and a workbook that cover such basic concepts as data types and how they are processed; how systems are developed; and how to select computer services.

The complete course costs $145. The free copies of the "Vendor Selection Procedure" are available from Info III at Suite 107, 21250 Califa St., Woodland Hills, Calif. 91367.

Series/1, Graphics Unit Tied

SAN DIEGO — A parallel interface system that links IBM's Series/1 minicomputer to Megatek Corp.'s 32-bit Megraphic 7000 graphics terminal is available from Megatek.

The Megraphic 7000 features self-contained refresh memory, 12-bit CRT resolution and a 32-bit microcontroller and word length. Other features include selective erasure, hardware translation, blinking and dashed lines; options include hardware rotation, scale, clip and zoom capabilities.

The terminal's dual bus structure interfaces with I/O devices through a separate peripherals bus, ensuring that the 32-bit graphics bus is not slowed by routine peripheral interrupt servicing, the vendor maintained.

All system interface functions fit on a single Series/1 pin-compatible board, designed for "easy" chassis installation, Megatek said.

With Series/1 linkage, the Megraphic 7000 costs about $27,000, depending on options, Megatek said from 3931 Sorrento Valley Blvd., San Diego, Calif. 92121.

Floppies Claim Improved Performance

WOODLAND HILLS, Calif. — Two versions of a double-density floppy disk introduced by Micro-Peripherals, Inc. feature an automatic diskette positioning and ejector mechanism said to improve reliability and performance.

The Model B51 is single-sided, storing up to 250K bytes of data on one side of a 5.25-in. diskette. The Model B52 reads and writes on both sides of the diskette, giving direct access to 500K bytes, a spokesman said.

The automatic positioning and ejector mechanism prepositions the diskette over the spindle hub before the clutch centering device is engaged, reportedly facilitating alignment of the diskette.

The mechanism also partially ejects the diskette when the door is opened for easy removal by the operator, the spokesman said.

A band head-positioning device reduces track-to-track access time to 5 msec, claimed to be five times the usual speed of such a function. In this development, the stepper motor turns a precision pulley, built to tolerances of .0001 in., which moves the recording head forward or backward to a track, the spokesman explained.

That technique differs from such methods as using lead screws, cams or other devices for positioning the read/write head on the diskette in speed and accuracy, he noted.

The design of the head assembly for the double-sided Model B52 drive incorporates a fixed-bottom head with a gimbled top head, providing more than three million in-contact passes of the media over a single track, according to the spokesman.

Both models of the floppy disk drives will accommodate FM, MFM, M²FM or GCR encoding techniques, the firm said.

The B51 costs $350 and the B52 costs $450. The vendor is at 21201 Oxnard St., Woodland Hills, Calif. 91367.

Book Details Floppy Care

MENLO PARK, Calif. — Has a newcomer to your word processing department ever destroyed the data on a floppy disk by fingering it to see how smooth it was? A free 12-page booklet from Square One Co. is designed to prevent that type of DP "tragedy."

"The Floppy Disk: What You Should Know" details the care and handling of the medium, how to properly mail floppies and how they work, according to a company spokesman.

The booklet should help newcomers feel more comfortable by giving them knowledge that could save them the embarrassment of ruining a diskette or losing data, the spokesman said.

Square One Co. is at 614 Eighteenth Ave., Menlo Park, Calif. 94025.

Got the 1401 payroll blues?

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The Year of the Supermini . . .

CHARACTERISTICS \ SYSTEM	DEC PDP-11/70	DEC VAX-11/780	DG M/600	HP 3000-III	Honeywell 6/57	Univac V77-800
Word Length (Bits)	16	32	16	22	16	16
Instruction Length (Bits)	16	32	32	64	48	16
Main Memory Cycle Time (Nsec)	1,000	600	800	700	550	600
Main Memory Maximum Capacity (Bytes)	2M	2M	2M	2M	2M	2M
Cache Capacity (Bytes)	2K	8K	Not Available	Not Available	8K	1K
Virtual Machine?	No	Yes	No	Yes	Yes	No
Floating Point Standard?	No	Yes	Yes	Yes	No	No
Low-End Configuration Main Memory Disk Capacity Other Hardware	256K Bytes 176M Bytes Console; Tape	256K Bytes 58M Bytes Console	256K Bytes 50M Bytes Console; Tape, Printer	256K Bytes 50M Bytes Console; Tape	128K Bytes 10M Bytes Console; 300 Line/Min Printer	256K Bytes 60M Bytes Console; Tape; Line Printer; Eight CRT Terminals
Software	RSX-11M	VAX VMS	AOS	OS Languages		Summit
Low-End Cost	$101,000	$128,000	$121,000	$105,000	$80,000	$135,000

Source: International Data Corp. Adapted with permission.

. . . A Look at What's Available

CHARACTERISTICS \ SYSTEM	PRIME 650	PRIME 750	HARRIS 570	PERKIN-ELMER 8/32	SYSTEMS ENGINEERING LABORATORIES 32/77-60
Word Length (Bits)	32	32	24	32	32
Instruction Length (Bits)	48	48	24	48	64
Main Memory Cycle Time (Nsec)	600	600	300	750	900
Main Memory Maximum Capacity (Bytes)	8M	8M	2M	1M	4M
Cache Capacity (Bytes)	2K	16K	2K	Not Available	Not Available
Virtual Machines?	Yes	Yes	Yes	No	No
Floating Point Standard?	Yes	Yes	No	No	No
Low-End Configuration Main Memory Disk Capacity Other Hardware	256K Bytes 32M Bytes Console	256K Bytes 32M Bytes Console	2M Bytes 300M Bytes Console; Tape; Communications	512K Bytes 10M Bytes Console; Tape	512K Bytes 80M Bytes Console; 75 In./Sec Tape; 600 Line/Min Printer; 300 Char/Min Reader; Register Transfer Modules
Software	Primos	Primos		OS-32, Fortran Utilities	
Low-End Cost	$95,000	$130,000	$276,000	$89,900	$109,900

Source: International Data Corp. Adapted with permission.

By Brad Schultz
CW Staff

Speakers on last year's DP seminar circuit frequently discussed two user trends that whet the appetite of every minicomputer vendor; small businesses and the coming proliferation of distributed processing.

The number of powerful, communications-oriented mini systems available to the distributed or first-time commercial DPer has grown remarkably in recent weeks.

Almost between the Rose Bowl and the Super Bowl, two major vendors introduced several systems capable of 32-bit computation with memory cycle times well under 1 microsec. Univac unveiled the 600 nsec V77-800, its first mini since acquiring Varian Data Machines, Inc. in 1977; Prime Computer, Inc. took the wraps off four models that support packet-switched networks and a variety of different vendors' terminals.

To help users prepare for this "Year of the Supermini," *Computerworld* has drawn up the above charts based on information provided by International Data Corp. (IDC). The charts are intended to allow the reader to compare the performance characteristics of 11 representative systems.

IDC obtained this data — which has been revised to allow for late-breaking developments — from the vendors themselves. With shipments yet to begin on some of models, user measurements are not yet possible.

Educational Data Systems, Inc. has just announced a minicomputer able to execute a complete arithmetic instruction in 400 nsec that accepts system software written for Data General Corp. Nova or equivalent minis [CW, Jan. 29]. The 16-bit system, called the Point Four, features a maximum of 64K words in main memory per processor; a dual-processor configuration delivers 128K words.

The charts show that seven of the 11 systems have minimum main memory capacities of 256K bytes. In terms of maximum capacities, seven systems — but not the same seven — offer 2M bytes each, while the Prime 650 and 750 each support 8M bytes.

In terms of main memory cycle times, the two largest mini vendors — Digital Equipment Corp. and Data General Corp. — offer two of the slowest systems in the class outlined. Harris Corp.'s Model 570 is both the fastest and most expensive of the 11 systems.

Mini Helps Test Safety of Nuclear Reactors

By Marguerite Zientara
CW Staff

IDAHO FALLS, Idaho — Nuclear reactor safety experiments that require uninterrupted electrical power are relying on a redundant minicomputer-baed power supervisory system here.

EG&G Idaho, Inc., an operating contractor for the Department of Energy's Idaho National Engineering Laboratory (Inel), originally controlled switching equipment for the experiments remotely using a direct-current supervisory loop. But EG&G decided to convert to computer control and an alternating-current supervisory loop simultaneous with the installation of a telephone switching system at Inel, according to James Barnhart, supervisor of special systems engineering for EG&G.

The redundant Hewlett-Packard Co. Model 1000 systems, each with 128K bytes of memory, were installed in June 1977 after a competitive bid showed the HP equipment met the performance specifications at the lowest price, Barnhart said.

Under the system circuit breakers, switches and other control devices are monitored.

Inel's power grid transmits 138,000V to six substations serving test reactors, Navy training facilities, a chemical processing plant and an experimental breeder reactor. The Supervisory Control and Data Acquisition System (Scada) controls power distribution, which is supplied by the networks of three regional power utility companies. In addition, it collects data on the status of circuit breakers, motor-operated air switches and other power-routing devices. It telemeters data on power demand and usage for each reactor area.

Data is logged into the HP data base and is used to prepare billings for each contractor at the site and for EG&G itself. Not only does Scada control and monitor functions for the power grid, it also monitors fire-fighting facilities through a Fire Supervisory System.

This effort involves monitoring the water system valve positions, waste gates, pressure alarms and sprinkler systems. Future plans in this area include monitoring the evacuation system's audible alarms, evacuation signals and control signs, which are used to route personnel to proper exits in case of fire.

System Design

Central data collection and device control reside with the two HP 1000 systems. While one of the two machines has been used for program development until now, by June it is expected to go on-line as a backup system.

Each system has a 4.9M-byte disk drive, and long-range plans call for them to be replaced with a single 50M-byte drive. All application programs, special drivers and utility software were developed in-house by EG&G personnel.

The primary computer runs four real-time partitions and two background partitions, along with the HP Model RTE-III operating system. The partitions are mutitasked to concurrently provide real-time control, data collection and reports.

Central Facilities

Inel's central facilities house the HP 1000s and two front-end processors supplied by Wescom Industrial. The central facilities also house two eight-color CRT terminals from Wescom that allow operators to watch over the system.

These terminals display symbol- and color-coded schematic diagrams of the power grid, which allows an operator to instantly recognize a device, know its location in the loop and read its status. Among the status conditions signaled — by the codes and by flashing or steady displays — are, for example, whether a circuit breaker is open or closed, whether it has been manually opened or tripped because of overload and whether it is part of the primary 138,000V loop or of a 12,500V secondary loop.

Commands, queued by a displayed menu, perform such operations as opening or closing motor-operated switches. The front-end microprocessors multiplex and concentrate outgoing commands and demultiplex incoming data.

At six remote substations, microprocessor-based Master Control Units (MCU) from Wescom perform the data concentration and multiplexing functions. A remote area may be an 80- to 100-acre complex harboring one or more test reactors, according to Barnhart.

Communications between the central site and the MCUs is over dedicated telephone lines; the longest link is 30 miles. Transmissions are synchronous at 1,200 bit/sec between the central site and the remote areas.

Within the central site and between microcomputer equipment at each test area, data transfers are asynchronous at 1,200 bit/sec, full- or half-duplex. At remote areas, each MCU communicates with outboard microprocessor-controlled Remote Terminal Units (RTU) from Wescom.

The RTUs, numbering 22 in all, interface to the discrete devices that control switches, valves, pulsed signals and contact closures for the fire supervisory system, the security alarm system and an industrial alarm monitoring system, Barnhart explained. The largest remote MCU, with 11 RTUs, monitors and controls the substation that supplies power to Experimental Breeder Reactor II.

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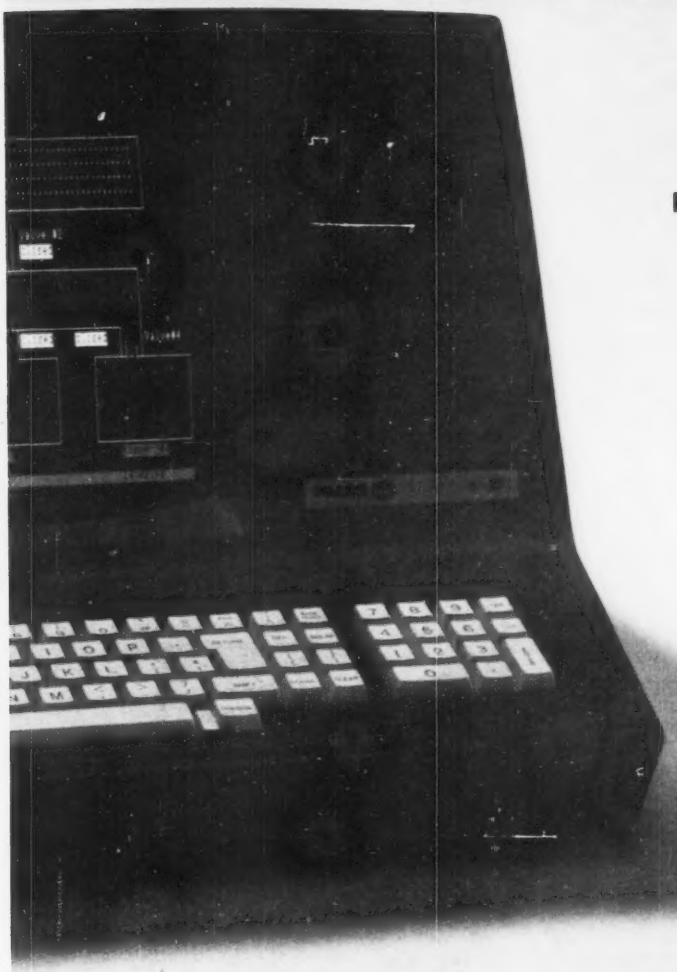

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Microprogrammed Units

Controllers Built for PDP-11 User

IRVINE, Calif. — A family of three microprogrammed controllers designed to meet the disk storage requirements of Digital Equipment Corp. PDP-11 users has been introduced by Emulex.

The SC11/A controller emulates DEC's RP11, RP02 and RP03 subsystems; the SC11/B emulates the RH11, RM02, RP04, RP05 and RP06 subsystems; and the SC11/C emulates the RK611, RK06 and RK07 subsystems, according to a spokesman.

The units were designed to operate without modification to the DEC host system. They offer features not found in the original DEC lines, such as an automatic self-test capability and subsystem diagnostics in on-board firmware, the spokesman said.

Compact Packaging

Compact packaging is one of the units' features, he added. Each controller is composed of two printed circuit boards that can be plugged into any pair of standard SPC slots.

No separate power supply is needed; 9A from the user's internal +5V source is sufficient, the spokesman said.

The SC11 family uses standard SMD interfacing. Any four industry-compatible drives can be integrated into a single subsystem, all operating at serial data rates up to 10 MHz.

Fully buffered disk I/O circuitry permits operation at radial cable distances of 50 feet and daisy chain cable distances of 100 feet, according to the firm.

In addition, the family offers standard Unibus interfacing via one of the two circuit boards to any standard SPC slot, uses approved bus drivers and receivers and presents a single unit load to all signal lines.

A 2K-byte random-access memory in the SC11 controllers provides a full three-sector data buffer in all applications, the spokesman said, eliminating "data late" worries and permitting multiple contiguous sector reads.

The memory also allows flexibility in selecting data packing or interlacing strategy and permits operation of the controller at a low bus priority level, he noted.

The A and B models of the controller are available for delivery now; the Model C will be available in March. Each basic model costs $6,000.

Emulex is located at 17785 D Skypark Circle, Irvine, Calif. 92714.

Micro Fits On Desktop

(Continued from Page 89)

Fortran IV with a linking loader, compatible assembler and subroutine library facilities.

A built-in serial port on the processor board can be used to drive a modem, line printer or additional terminals, according to the firm. The VDP-80 will support various hard-copy devices including the Teletype Model 40 line printer running at 300 line/min.

Two power supplies are provided with the VDP-80, one for the disk drive and CRT and the other for the keyboard, 7-slot card cage and the printed circuit boards.

The VDP-80 with 32K bytes of RAM and a dual double-density floppy disk drive costs $6,995 from Imsai at 14860 Wicks Blvd., San Leandro, Calif. 94577.

Xebec Cuts Disk Prices

SANTA CLARA, Calif. — Xebec Systems, Inc. has announced a 30% price reduction for its single-board cartridge disk controller, which emulates Digital Equipment Corp. controllers.

The list price of the Xebec Quad has been lowered from $2,800 to $1,975; quantity discounts are still available.

The Quad emulates DEC's RK05-RK11 cartridge disk system and has an embedded controller for DEC PDP-11 and LSI-11 systems. The latter allows the interfacing of four drives per system with a range of 2.5M bytes to 20M bytes per drive, Xebec said.

Nonstandard configurations are also available to extend system capacity beyond that of the RK05.

Xebec is at 2985 Kifer Road, Santa Clara, Calif. 95051.

The intelligent memory for PDP®-11/70's.

More than bits in a box. The MSC 3602 PDP-11/70 add-on memory has its own microcomputer that keeps it, your 11/70 and you out of trouble.

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A double bit error causes a parity error message to be sent directly to the CPU.

Turn off the ECC and you can run full diagnostics.

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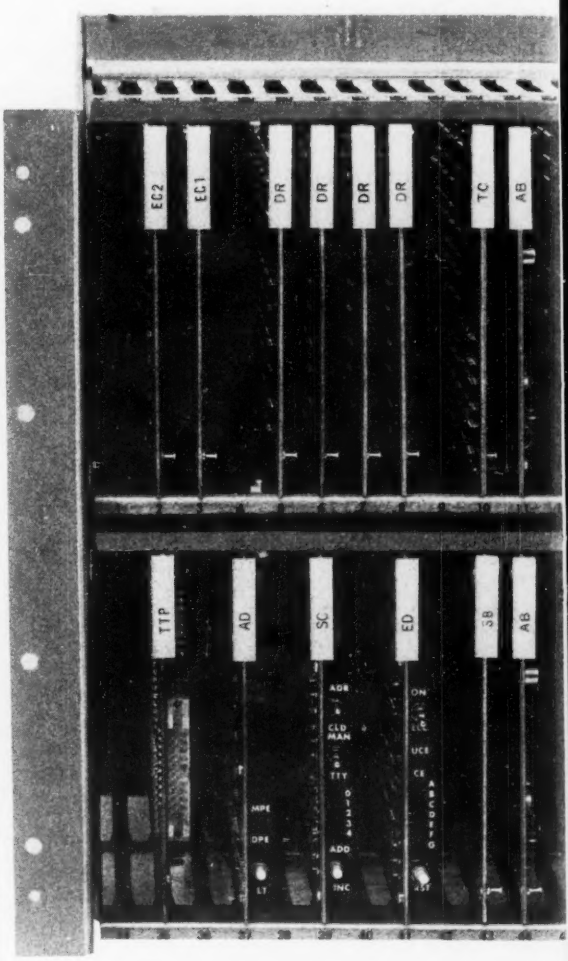
Memorizing more? The MSC 3602 will grow with you. It's expandable in 64K byte increments, with 2 megabytes in a single 10½" high free-standing or rackmount chassis including power supply and forced air cooling. An additional 10½" chassis will give you the total 4 megabyte PDP-11/70 maximum memory.

And MOS memory offers you low power requirements. Nonvolatility is available with battery backup.



Intelligent design. The MSC 3602's small size allows close placement to the CPU. Shorter bus lengths allow higher speed and reduce noise problems.

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Book Sets Guidelines

Users Told When to Automate, When to Wait

By Brad Schultz
CW Staff

SANTA BARBARA, Calif. — No ailing business should computerize. "If there isn't an ordered and well-oiled set of procedures — however informal — to your business, wait to buy a computer."

That advice comes from *Winning the Computer Game*, a guide to business computer systems published by Data Decisions Corp. (DDC), a firm that specializes in business computer installations.

Written by DDC President Christopher D. Kloeck, the book recommends when a business should not computerize, when it should, how to buy systems and services and how to live happily with them.

While warning that "a computer can make a sick business terminally ill," the book advises any firm that is satisfied with current manual operations to avoid computerization. "Why rush into extra work? Keep in mind that 'pioneers get arrows,'" Kloeck warns.

Even if a firm's major competitor has just bought a computer system, that is not sufficient grounds for the firm to do likewise.

"If you don't know what you're going to do with the computer, it will do exactly what you've got in mind — nothing," Kloeck said.

Possible Grounds

On the other hand, a business that is "humming along" and has a clear vision of how a system might help should consider computerization. Good grounds for automating exist if the firm sees how the system could do work that otherwise could only be done by additional staff, how the system could pay for itself or how it could even produce profits.

According to Kloeck, any business decision is simply a choice in how to use one of three scarce resources: people, time and money. "A computer should be considered a tool to help optimize one or more of those resources," he maintains.

To select a system wisely, the business needs to know the sort of data the system will store, how the data might be organized, how much data the firm will need to store and how it will input that data.

The business will also need a plan for measuring system performance that can reliably indicate whether the system is meeting the goals set for it, the book suggested.

Rule of Thumb

For any business, the total annual costs incurred by its computer system should not exceed 1% of the firm's gross sales.

Kloeck indicates that this rule of thumb is usually violated when companies either fail to define "exotic" applications problems or fail to set performance goals.

The book counsels executives to be prepared to modify *any* system they may purchase if they expect to implement it without offending many people.

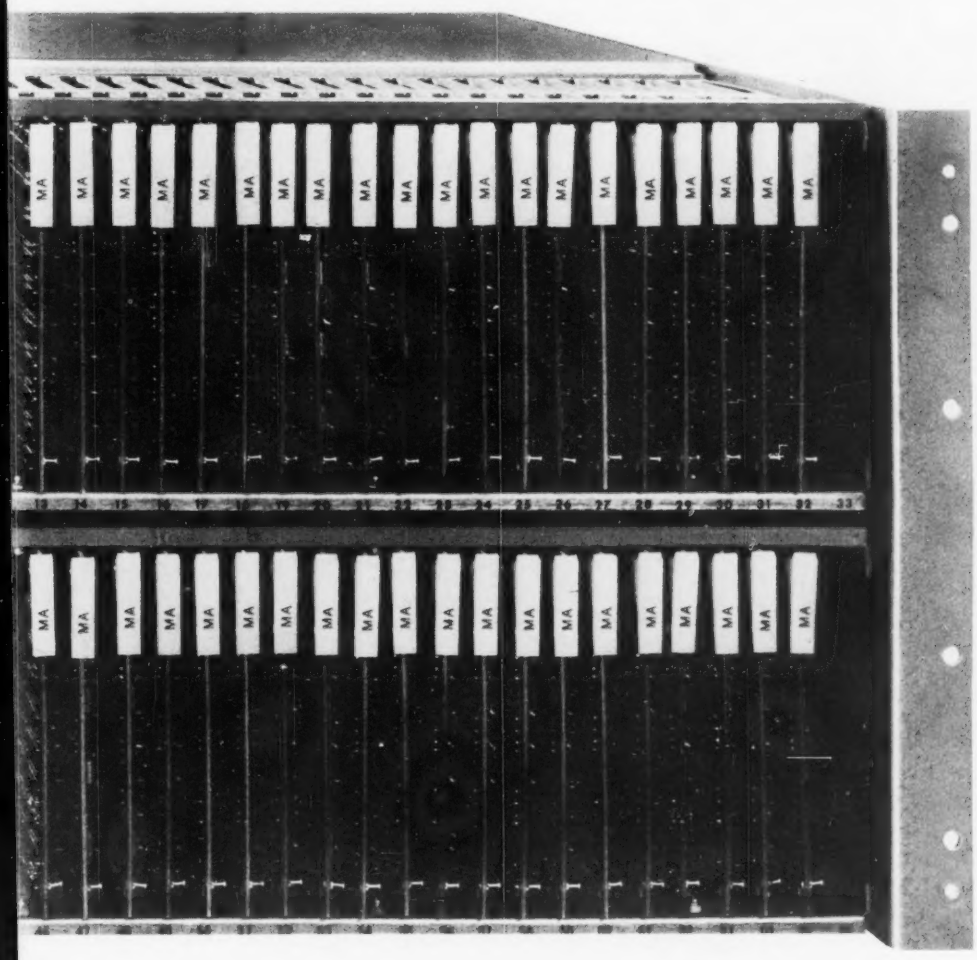
Because "people resist change," no package ever proves ideal, Kloeck explained.

Software Key

The key to successful performance is software rather than hardware, he asserts. The business scouting for systems should therefore not spend too much time in comparing CPUs; after one or more processors are found that "promise a high probability of success," the search should focus on programs.

Winning the Computer Game endeavors to explain how the commercial user can obtain the information needed to purchase the right system. The book compares the problems and possible benefits of internally developed software with those of vended packages. It also covers such topics as contract negotiation and maintenance.

The 178-page guide cost $12.95 from DDC Publications at 5386 Hollister Ave., Santa Barbara, Calif. 93111. A 30-day return privilege is provided.



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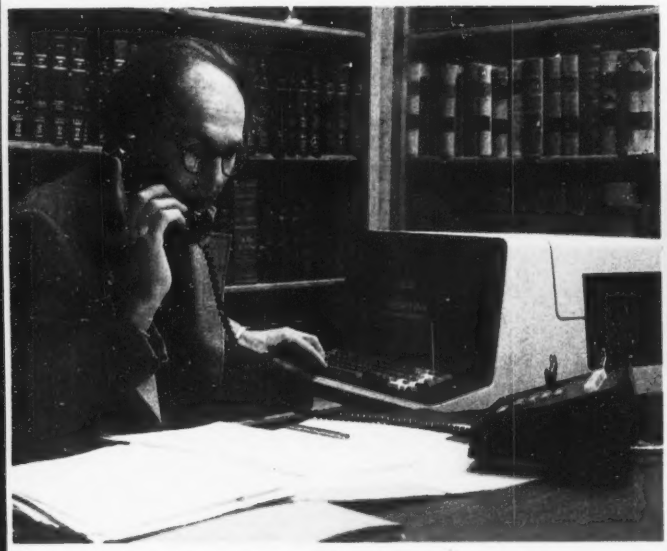

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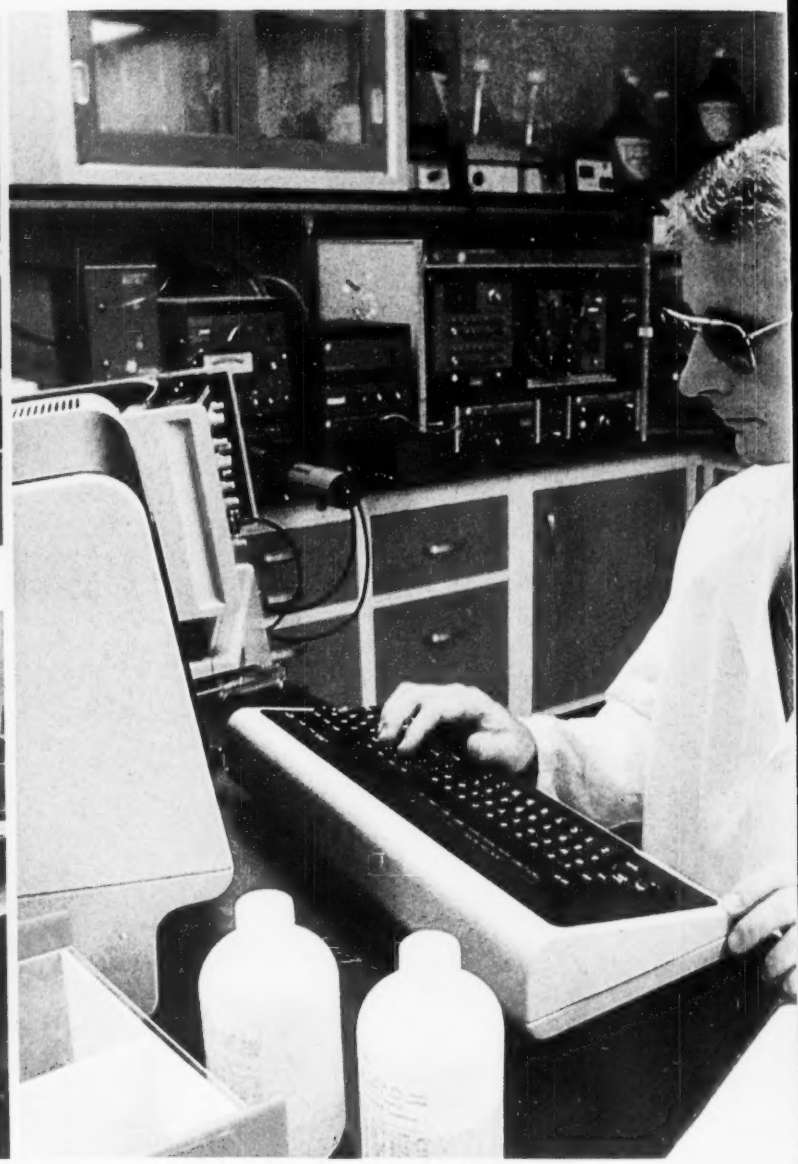

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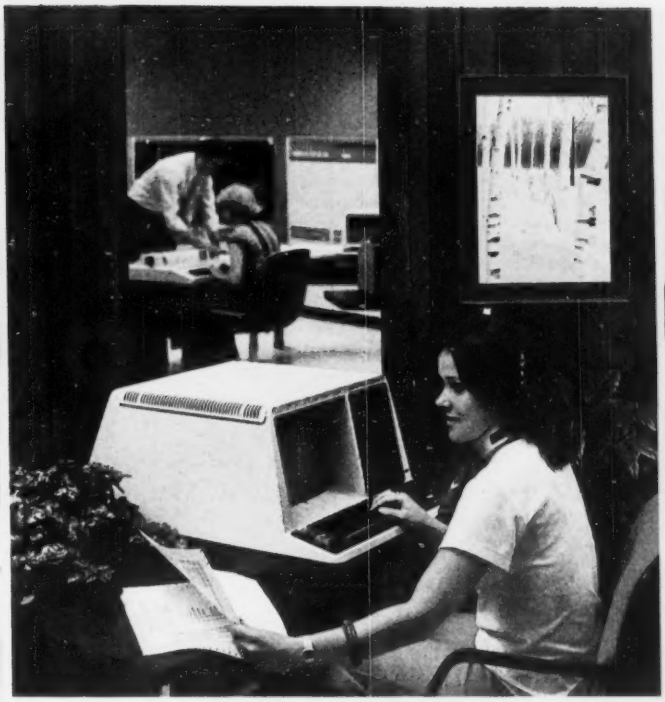

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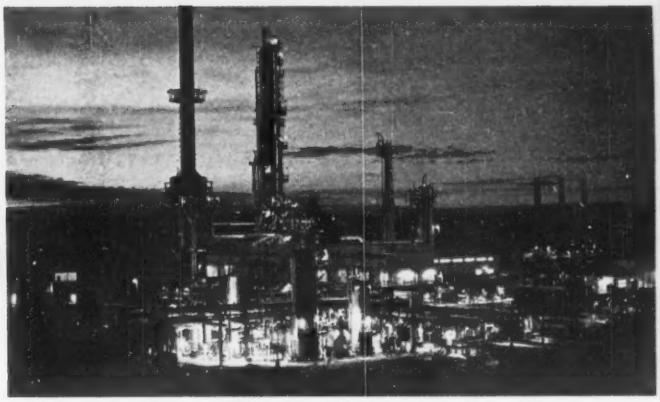

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Military Automates Inventory

Warehouse Plans to Save Taxpayers $6 Million

By Marguerite Zientara
CW Staff

ROBINS A.F.B., Ga. — A 320,000 sq-ft military warehouse here expects to save $6.5 million of taxpayers' money during a five-year period with its minicomputer- and microprocessor-based inventory retrieval system.

The warehouse, which has 50,000 items in inventory, has more than quintupled its productivity using the Warehouse Information Control System (Wics) designed by Clay Bernard Systems International (CBSI) of Tulsa, Okla., according to Col. J.W. Dennis, director of distribution at the warehouse site.

The on-line nature of the system has eliminated the need to "batch pick" warehouse orders. This required a warehouse vehicle to return to the same location for goods many times in one day; Dennis explained.

Warner Robins Air Logistics Center's system is based on the use of 19 wire-guided order-picking trucks, each individually controlled by a National Semiconductor Corp. M-16 microprocessor with 92K bytes of memory. All are centrally controlled by four Data General Corp. CPUs.

When certain material needs to be "picked" from storage, a CPU transmits that information to the order-picking truck closest to the merchandise to eliminate unnecessary movement within the warehouse. The information is transmitted over the same wire that guides the truck.

Central System

The warehouse central control system consists of three DG Eclipse S/200 computers and one backup S/200. Two of the computers have 256K bytes of main memory and two have 64K bytes of memory.

One CPU is used as the master control unit, controlling and updating all files and providing on-line data to the other CPUs when needed.

The second unit is on-line to 40 CBSI Sage I terminals located throughout the warehouse and in the maintenance department.

That CPU receives requests for materials and forwards them either to the master CPU or to an Air Force DP system that approves requests for materials.

The third CPU communicates with the 19 order-picking trucks, managing each truck's movements and receiving data from each truck's microprocessor.

The backup CPU is available if any on-line unit should fail and reportedly can be put into service in less than 30 minutes.

Fourteen terminals are used for processing materials receipts, issues and inquiries. Another 26 remote terminals are located in the maintenance area to allow personnel there to order material for repairing an item or to return repaired items to supply.

Each CBSI terminal, including those mounted on order-picking trucks, includes a 12-in. CRT, alphanumeric keyboard, badge reader, 80-column card reader and 80-column card printer.

Information Path

Information on all material coming into the warehouse is first input to a CPU through one of two data terminals located at the end of each receiving line.

Every incoming lot has an 80-column Hollerith card attached. An operator verifies that the material received is the same as what is printed on the card, then removes the card and enters it into one of the terminals.

If the item is currently in the warehouse, the CPU assigns the fresh stock to the existing location. If the item is new to the warehouse, the CPU will request the item's National Stock Number (NSN), size and weight.

The CPU then assigns a storage address based on the item's size to maximize cube utilization in the warehouse. The terminal operator puts the item on a wheeled module, enters the module number and identifies the shelf on which the item will be placed.

A bin-routing slip is generated by the CPU and manually attached to the item. Among other information, the slip contains a control number identifying that particular lot of material.

At this point, the item has been received into the system and can be picked against a materials request even before it is stored.

When an order-picking vehicle enters a specific aisle in the warehouse, all of the items to be binned in that aisle are "known" to the computerized vehicle. It stops at the first location and displays the binning screen to the operator.

He places the material in storage and then enters the control number from the item he has put away. If the control number matches the number contained in the vehicle's memory, the operator will be permitted to move on.

If the control number does not match, the operator is instructed to check the item he has binned to ensure he picked up the one intended for that location.

In addition, a vehicle that is performing binning actions will receive on-line information from the controlling CPU concerning "issues," or picking jobs, that need to be made in that area. Since the CPU keeps track of the positions of all 19 order-picking vehicles, it can assign issues to the vehicle closest to the requested material.

Final Steps

As a vehicle completes its work — either binning or issues — it maintains a status file. When it is polled by the control system, it responds with a "work done" signal.

When the operator picks an item at a location and enters TASK COMPLETE, an issue-routing document is automatically printed by the vehicle's 80 char./sec printer. This issue-routing document contains the NSN, quantity, condition, code, routing, identification and other data needed to go with the item.

The operator then attaches the document to the item and places it on his vehicle.

When the vehicle reaches the end of an aisle, it turns 90 degrees, stops, raises its lift and deposits its storage module on a conveyor belt connected to the issue area.

At the issue area, an operator enters the control number of each item into a data terminal. The master CPU activates one of two line printers to create the proper shipping document for each item.

Besides the four DG CPUs, the process control system includes three Control Data Corp. 100M-byte disk drives, two DG 800 bit/in. 9-track tape drives and one DG 800 bit/in., 7-track tape drive.

Also included are two Dataproducts Corp. 600 line/min printers, a DG card reader and a Peripheral Dynamics, Inc. card punch.

"This is the most accurate inventory retrieval system we could find," Dennis said.

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ADDS REGENT

Record Company Turns to Mini as Sales Soar

Special to CW

LOS ANGELES — A producer of popular music recordings found relief in a minicomputer after skyrocketing sales forced the firm to improve communications with a remote mainframe.

The mounting volume of data traffic also moved Casablanca Records and Filmworks here to employ high-level languages and to simplify procedures, according to Joe Ermilio, the company's DP manager.

Those demands have been met, Ermilio said, by a Wang Laboratories, Inc. VS CPU with twin 75M-byte disk drives, a 600 line/min Model 2263 matrix printer, two CRT terminals and an operator console. The system features RPG-II and Cobol as well as customized financial software written by MDS Softpro Systems of San Francisco.

The need to upgrade became acute after Casablanca merged in 1977 with Polygram, Inc., a consortium of about 12 other record producers. Scouting for CPUs, Ermilio learned that one of the Polygram labels was pleased with its Wang system and that Polygram headquarters also relied on a Wang to assist management.

In addition, Ermilio was impressed by the Wang VS display at the 1978 National Computer Conference in Anaheim, Calif.

He eventually rejected the products of IBM, Digital Equipment Corp., Data General Corp., Harris Corp., Inforex, Inc. and Sycor, Inc. "Wang seemed to be the only manufacturer that could meet the software language requirements and hardware delivery date I wanted as well as supply the best overall price/performance ratio, which was quite important," he explained.

IBM's System/34 "was just not sufficiently upward-expandable to satisfy our stringent growing needs and had a long delivery date," Ermilio recalled. "DG did not provide the higher level language capabilities, and the remaining vendors lacked delivery data or [imposed] some combination of features that would have hindered our desired overall flexibility."

Communications Web

A reliable communications network is mandatory to effectively keep pace with Casablanca's more than $100 million in annual domestic sales of records.

The web that links Casablanca's Los Angeles headquarters to thousands of retail outlets is comprised of 12 regional sales branches located across the U.S. Within each region are several local branch offices; stock is warehoused in three major depots that serve as distribution sources for the sales network.

"Each day, approximately 50,000 sales records are transmitted from three depots to an IBM 370/148 mainframe located at Polygram," Ermilio said. "The mainframe performs the necessary number-crunching on this data, from which four sales and inventory reports are generated for all of Polygram's labels." Each record company receives the reports either through the mail or via telecommunications.

Daily access to this information is an absolute necessity. "If we used the mails," Ermilio pointed out, "we'd be at least a day behind — which is unacceptable, because it would have a significant deleterious impact on our cash flow and inventory control."

Awareness of Trends

Record producers in the area of rock music must be keenly aware of buyer trends. Their success depends on accurately assessing whether a new star is a genuine comer or a flash in the pan. "Lack of proper management reaction caused by slow sales information feedback can literally cost millions of dollars during short time periods," Ermilio observed.

Casablanca meets this challenge with about 20 accounts payable and general ledger reports generated by the Wang VS on a daily, weekly, monthly or quarterly basis. "The system is totally interactive," Ermilio said. "We also make use of sales reports with detailed dollar breakdowns per region and from branches within regions."

Casablanca uses the Wang VS to process transactions with some 5,000 organizations or individuals, including other record producers, artists, album jacket designers, advertising agencies, radio and television stations, newspapers and film producers.

Casablanca uses the mini to compile a daily inventory status report in order to note the number of albums at each depot or at various packing and pressing plants. "If a depot in one part of the country is running short in a selection and another depot has a large supply of that particular selection, we ship it from one to the other," Ermilio explained.

The Wang VS was credited with saving Casablanca $5,000 to $10,000 in monthly payments to DP service bureaus. With virtual storage the Wang provides "mainframe throughput at minicomputer cost," Ermilio declared.

"We can now have multiple programs working simultaneously within a limited amount of core," he continued. "Because [the programs] don't all have to be in core, we are realizing [memory] space savings with high performance.

"In the past, with mainframes, one could typically utilize only 35% of the computer power. With our system, we can utilize 80% to 100% of its power," he added.

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3. ST. PAUL — Twin Cities Computer Expo, Civic Center, (612)224-7361, April 3, 4, 5
4. SAN FRANCISCO — Northwest Computer Expo, Civic Auditorium, (415)558-5065, April 17, 18, 19
5. LOS ANGELES — Southwestern California Computer Expo, Los Angeles Convention Center, (213)741-1151, April 24, 25, 26
6. HOUSTON — Southwestern Computer Expo, Albert Thomas Convention & Exhibit Center, (713)222-3561, May 8, 9, 10
7. CHARLOTTE — Southeastern Computer Expo, Civic Center, (704)372-3600, May 15, 16, 17
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Laundry Room Micro Shines in Hollywood

By Ann Dooley
CW Staff

HOLLYWOOD, Calif. — "Behind every great computer, there is a microcomputer telling it what to do" could be Emil Rich's motto in his job as engineering supervisor of the videotape department here at American Broadcasting Co. (ABC).

Responsible in part for managing several Digital Equipment Corp. PDP-11/-34s, which edit and schedule ABC's daily television programming, Rich initially tests and modifies many of the computer programs on his own home microcomputer system.

Located in his laundry room, the desk top microcomputer serves Rich as a modern-day "drawing board." Rich contends that frequently he can be more creative away from the hectic pace of his office, where 122 employees, more than 30 machines and frequent emergencies take up much of his working day.

Once away from ABC, Rich might think of a programming idea and work it out on his own home micro system. If the programming idea should prove successful on the micro, he punches it out on tape and takes it to ABC the next day to try out there. Very few changes are ever needed to adapt a program to the larger system since both systems use the same Basic language, he noted.

Initial Interest

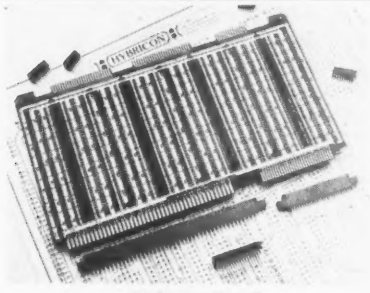
Rich first became interested in computers about three years ago, when ABC converted its electronic editor to an automated editing system. The automated system permitted more sophisticated audiovisual techniques to be used in TV shows — techniques like dissolves, keys and wipes — and generally allowed for more creative program design, Rich noted. But a certain amount of thought and effort was required to implement these techniques.

Having heard about the advent of the small computer, Rich decided to use one to work out techniques for the shows. He purchased a Mits Altair 8800 system, manufactured by Pertec Computer Corp.'s Microsoft Division. Since he had no background in computers, he began teaching himself to operate and program the system.

"I had the Basic manual, bought several other books and asked a lot of questions," Rich commented. It took about six months before the system was operational, and then more time was needed for peripherals and additional memory.

The system consists of the Mits 8800 with 64K bytes of memory, a self-built power supply, a Persci, Inc. dual floppy

(Continued on Page 102)



Hybricon Board

Boards Customized For Wire Wrapping

LITTLETON, Mass. — Hybricon Corp. is now offering the Micro-Designer Series of wire-wrappable boards with customer-preferred-location, wire-wrappable socket pins installed.

The customer selects the pins to be installed; Hybricon installs them and then ships them back to the customer. All the Micro-Designer Series board will accept devices on .2-, .3-, .4-, .5-, .6- and .9-in.

The boards feature plated-through holes on a .1-in. spacing, multiple ground and power planes, a bypass capability provided for all independent planes and ground prepinned and I/O locations. Each board comes with the firm's Documentation kit, which includes an assembly master, hole location grid and parts list to aid design and layout.

In quantities of one to three, the 2-8010A costs $92.50, the 2-8010B costs $97.50, the 2-Z80A costs $68.50 and the 2-6800MMA costs $69.50. Hybricon is at 410 Great Road, Littleton, Mass. 01460.

Quick Action Urged For NCC Participation

NEW YORK — A call for participation in the Personal Computing Festival of the 1979 National Computer Conference here June 4-7 has been issued and individuals wishing to present papers or participate in some other fashion are urged to contact Jay P. Lucas as soon as possible.

Since the deadline for receipt of final papers in camera-ready form is March 15, immediate action is imperative.

The four-day festival will feature technical sessions, panels and tutorials as well as applications demonstrations and commercial exhibits devoted to microcomputer products and services.

Lucas can be reached at 3409 Saylor Place, Alexandria, Va. 22304.

Intel Offering ANS 78 Basic For Intellec Development System

SANTA CLARA, Calif. — Basic-80, a high-level language and interpreter, has been introduced by Intel Corp.'s Microcomputer Systems Division for its Intellec microcomputer development systems.

The interpreter, designed for both beginners or the more experienced, provides an interactive environment for program development, testing and debugging, the firm said.

Basic-80 includes features provided by the standard ANS 78 Basic, such as string and numeric constants, variables and arrays, as well as the function that allows users to define single-statement functions.

Basic-80 extensions provide access to the Intellec system disk files for full sequential and random disk file input/output. They include support for the Intel single-and double-precision floating-point standards and provide for integer and string data types with extensive string manipulation capabilities.

Language extensions include direct read and write through Peek and Poke functions, a formatted print statement with the Print Using function and If . . . Then statements extended with an Else clause.

Other Basic-80 extensions include Boolean operators and operation with matrices with up to 110 dimensions, as well as user-directed error trapping and handling functions plus a program execution trace command.

Basic-80 also provides a local computation facility for the solution of engineering and business management problems as well as a prototyping tool for other microcomputer software, such as PL/M-80 and Fortran-80. It also allows subroutines written in other Intel languages such as the 8080/85 macro assembler to be called from the Basic-80 programs.

Basic-80 can be added to any of Intel's Intellec Series II or MDS-800 series microcomputer development systems with 48K bytes of random-access memory (RAM) and at least one disk drive. It is available on single- or double-density diskettes for $750 with accompanying manuals. The order product code is MDS-320. Intel is at 3065 Bowers Ave., Santa Clara, Calif. 94301.

Interpreter, Source Listings

Business Users Get Basic Tools

RICHARDSON, Texas — Business users can now take advantage of a source listing of Disk Basic Etc, a Basic language interpreter, as well as Basic source listings and language and user manuals from Binary Systems Corp.

The source listings for Disk Basic Etc are designed for Z80- and 8080-based systems and include a 48-page language manual and a 50-page instruction manual for modifying or adding routines.

Together with the manuals, the 6,000-line source listing allows users to equip their systems with a Basic interpreter that can include user-defined command and I/O routines. As many as five custom commands can be added without reassembling the program, the firm said.

The interpreter features 60 standard commands and statements. The program generates 32 error message codes and features editing capability. Direct memory and I/O addressing is standard.

Source listings and manuals for Computer-Prepared Accounting, a general ledger system, and Write-On, an automatic letter-writing system, are also being offered by the firm.

The source listing for the general ledger system consists of 2,000 lines of code and includes routines such as indexed sequential access method (Isam) and routines for chaining trailers both forward and backward, according to the firm.

The system is structured for conventional double-entry, debit/credit accounting. It accommodates up to 200 accounts.

Write-On consists of 700 lines of code; in addition to utilities, the source listing includes segments of string manipulation coding that illustrate the use of string operators and functions. Write-On automatically types in disk-stored variables.

The programs and work space of each system require at least 32K bytes of random-access memory.

The Disk Basic Etc source listing costs $100; the general ledger and letter-writing source listings cost $75 each. They can be purchased from The Micro Store, 634 S. Central Expressway, Richardson, Texas 75080.

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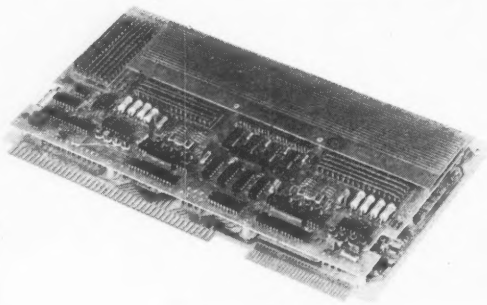
Dataram Has Memory For SBC 80 Types



Dataram Model DR-181

CRANBURY, N.J. — Dataram Corp. is now offering its single-board 16K- by 8-bit nonvolatile core add-on memory for use with Intel Corp.'s SBC 80/10 and SBC 80/20 computers.

The Model DR-181 can also be used with computers from other manufacturers that offer SBC 80-compatible products, the firm said.

The DR-181 has the same mechanical outline dimensions as the SBC 80 series and operates from +5V and +12V. Cycle and access times are 900 nsec and 265 nsec, respectively.

A block of memory within the DR-181 can be write-protected. Address strapping is achieved with an on-board DIP switch.

The DR-181 costs $880 from Dataram, Princeton-Heightstown Road, Cranbury, N.J. 18512.

Pet Control, Logic Detailed

LOS ALAMOS, N.M. — A workbook from Total Information Services (TIS) on the Commodore Business Machines, Inc. Pet system control and logic covers testing, branching, subroutine use.

Binary-to-decimal-to-binary conversion programs demonstrate the logical operations.

The workbook costs $3.95. Those wishing more information should send a stamped, self-addressed envelope to TIS, P.O. Box 921, Los Alamos, N.M. 87544.

Micro Works Behind Scenes

(Continued from Page 101)

disk system, a printer with both reader and punch, a CRT terminal, a serial interface and a parallel port. Using modified Basic, the system runs under the CP/M operating system.

A Faithful Companion

Some of the applications Rich experimented with on the micro included a program to determine how loud the music in a particular show would rise or fall, a program to decide when a TV show should fade into a commercial and programs for personnel and facilities management. The system also helps Rich to schedule personnel and facilities.

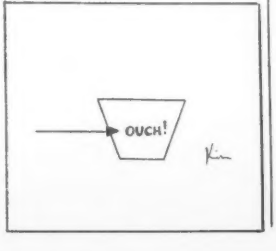
The station's most challenging project will be to tie all the on-air machines, such as videotape players and film chains, to the network computers. These machines are responsible for getting shows on the air at an exact time, and it will be quite a job, Rich said.

ABC is also planning to put terminals in many of its departments, drawing on a central computer in the videotape department that runs in a time-sharing mode. The micro may be involved there, too.

The micro has never failed Rich. "There were a few problems in getting the system started, but those were my own mistakes," he said. The idea of using a micro to pretest ideas has worked out remarkably well, he added.

But "the educational process never stops," he admitted. "I will never know everything I want to know about computers. And to think I came into the computer world completely cold, not even knowing what a computer language was."

Rich intends to program the micro to automate tasks in his own home, such as various kitchen functions, a burglar alarm and lighting and heating controls. However, Rich admitted he hasn't progressed very far on that project, since much of his at-home time is spent using the microcomputer to work out more programming concepts for ABC.



Directory to Aid New England Users

BOSTON — Microcomputer users and prospective buyers can take advantage of a directory to locate products and services in the New England area this April.

Called *The First New England Microcomputer Resource Handbook*, the directory will list and describe computers, peripherals, software, retailers, repair organizations, courses, clubs, user groups, user publications and trade journals, according to its *The Boston Computer Society.*

Available for $2

The handbook will be approximately 75 pages long and cost $2 at computer stores or by mail from the society. Listings in the directory cost $5.

More information is available from The Boston Computer Society at 17 Chestnut St., Boston, Mass. 02108.

Basic Programming Course Combines Cassettes, Text

WILLIAMSVILLE, N.Y. — A Basic language programming course consisting of 12 cassette tapes coordinated with 12 printed texts and intended for use by hobbyists, small business users and students is available from Williamsville Publishing Co.

The learner can hear on tape in-depth explanations of what he is seeing in the text and can proceed at his own pace, the firm noted.

Three Modules

The course is divided into three modules: "Programming in Basic," "Intermediate Basic" and "Advanced Basic," each consisting of four cassette tapes with accompanying texts.

Topics include commonly used Basic language instructions and commands. Sample programs illustrate the use of each type of instruction.

All three modules sell for $58; individual modules sell for $19.95 each from Williamsville Publishing Co., Box 237, Williamsville, N.Y. 14221.

Guide Outlines Wholesale Prices

ANN ARBOR, Mich. — A wholesale price list for most major brands of microcomputers has been published by NCE/Compumart, Inc. The guide lists the prices NCE will pay for equipment as well as indicating how to obtain a formal quotation for a machine.

The guide is intended for the computer store or salesman whose client wants to trade in a used system. NCE markets the used computers it purchases through its mail order catalog operations.

The price list is free from NCE/Compumart, Inc., which can be reached through Department PC8, P.O. Box 8610, Ann Arbor, Mich. 48107.

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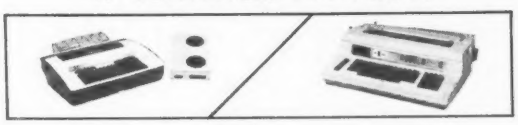

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Expected to Drop Prices

PCMs Not Surprised by IBM 4300

By Marcy Rosenberg
And Marcia Blumenthal
CW Staff Writers

Few IBM 370 plug-compatible manufacturers (PCM) were surprised by the long-awaited 4300 series announcement [CW, Feb. 5].

Virtually all the independent mainframers termed the IBM pricing "aggressive." Only a handful, however, admitted they would make some price adjustment.

But hardly any company could disagree with Nanodata Corp. President Jack Liebel who maintained, "How can anyone say that when IBM makes an aggressive move it isn't going to affect them? It will affect everyone."

Liebel's small Williamsville, N.Y., firm — which started selling IBM 370-compatible processors barely five months ago — will drop incremental memory prices on its VMX 200 and 400 to attempt to stay competitive.

Similarly, Control Data Corp. is expected to match IBM's incremental memory cost of $15,000 per 1M byte, according to Stephen J. Ippolito, president of IPL Systems, Inc., the designer and manufacturer of CDC's Omega line.

He further predicted CDC would cut Omega system prices "as much as necessary to sell the machines."

Ippolito could not be more specific about price adjustments, but did say a new Omega CPU (a CDC 480 Model 3) will be unveiled soon that he claimed will be faster than the 4341. CDC declined to comment on the announcement.

One of CDC's major competitors, National Semiconductor Corp., also was mum on IBM's new generation of computers at press time. But a company spokesman proclaimed the firm would be able to "say something intelligent"soon.

Not Intimidated

However, one of National Semi's largest customers, Itel Corp., said the 4300 series "was consistent with our expectations." John H. Clark, company president, defended his firm's product line, particularly the Advanced System (AS) Model 3, which is designed to emulate the 370/138 and 148.

The National Semiconductor-built processor can exceed the performance range of the 4300, Clark said, noting that the AS/3 "is deliverable now." By comparison, IBM's 4331 won't be available until the second quarter; the 4341, by year's end.

Itel claims an installed base of 300 IBM-compatible processors that emulate a full range from the 370/138, 148 and 158-3 to the 3031 and 3032.

Similarly, Magnuson Systems Corp. said it had the architecture required to make its products competitive with IBM's on a price/performance basis. "We have no problem with the pricing or the technology of [IBM's] product," according to Joseph L. Hitt, president and chief executive.

While he insisted Magnuson could meet IBM's price, Hitt acknowledged that the company.

(Continued on Page 104)

Picking Wrong Organizations

U.S. Firms Misusing Japanese Reps

By Yuji Ogino
Special to CW

TOKYO — The limited success met by many U.S. companies selling their products and services in Japan is because of misselection and/or misuse of their selling organizations there rather than obstacles in the marketplace.

This year, Japanese computer users will spend about $5 billion for products and services. Yet U.S. companies will barely dent the Japanese market, supplying it with only about 8% of its computer products.

This percentage could be much higher if U.S. companies properly selected and utilized their Japanese trading companies and sales representatives.

Because representing foreign, high-technology companies with products such as computers adds to the prestige of a Japanese trading company, they actively solicit U.S. firms, offering them sales representation. However, many of these trading firms and agents lack the qualifications to effectively sell computer products to Japanese customers.

For example, even large Japanese trading companies with substantial assets and widespread sales offices often do not have the customer service and software support personnel necessary to handle computer products that need to be sold as part of an application solution, rather than as hardware only.

When the selling effort also involves application products and post-installation support and service, a Japanese systems house is often a more successful representative for a U.S. computer company than is a large trading company.

Products such as minicomputers, intelligent terminals and software — which require application knowledge, training and installation support — particularly lend themselves to sale by systems houses. On the other hand, trading companies can be effective in the sale of basic hardware items such as peripherals, telecommunications equipment and OEM mini- and microcomputers.

Fortunately, there are now more

(Continued on Page 112)

Iranian DP Market at Standstill

By Marcia Blumenthal
CW Staff

With the departure of the Shah and the political conflict between Prime Minister Shapour Bakhtiar and Ayatollah Khomeini growing, the fine line between political chaos and civil war hovers tenuously over Iran.

In recent interviews, U.S. computer vendors with marketing outlets in Iran minimized the effect of the political turmoil on their businesses, rationalizing that sales to the oil-rich Middle Eastern nation represent only miniscule revenues for their companies.

Yet the Iranian computer market, which promised equipment sales of about $12 million a year, tempted virtually all major U.S. mainframers and a smattering of minicomputer vendors to establish marketing ties there.

U.S. vendors had nearly the entire Iranian market sewed up. Now that market has come apart at the seams.

Market Outlook

The market outlook in Iran is not attractive in the near term, according to Michel Smith of the U.S. Department of Commerce's Iranian desk. Overall, U.S. companies sold Iran about $3.5 billion in goods and services through last November.

Smith predicted U.S. exports to Iran would drop by a third and could fall further.

Basic commodities will be the items least affected, he predicted, but the demand for capital goods will plummet, dropping by at least 50% during 1979. "It could be two to three years before things settle down," he added.

Vendors said they had not suffered financial losses on equipment sales to Iran. In many cases, U.S. firms sell through Iranian distributors, usually requiring payment in advance of delivery.

However, Electronic Data Systems (EDS), which had hefty facilities management contracts with Iran's Ministry of Health and Social Welfare, cancelled them in December. At that time,

(Continued on Page 110)

Amdahl Drops Bid for Comten

SUNNYVALE, Calif. — Even before some weekly newspapers with early deadlines were able to report Amdahl Corp.'s recent surprise bid for Comten, Inc., Amdahl withdrew that offer, ending its maiden flirtation with the acquisitions game.

A little more than two weeks ago, Amdahl made an unexpected bid against NCR Corp. for Comten, offering to acquire the St. Paul, Minn., data communications firm on a share exchange basis [CW, Feb. 5]. Amdahl's offer had a cash equivalency of about $26 per share, $4 higher than the cash tender offer NCR made on Jan. 19.

Without explaining its action, NCR quickly boosted its offer to $26 per share, matching Amdahl's offer.

Amdahl then withdrew its bid. "We felt that to be competitive with the NCR offer, which was nearly one-half cash, we would have had to increase our offer another $3 or $4," an Amdahl spokesman said. Amdahl did not want to include cash in its offer, he added.

Comten's board of directors accepted the revised NCR bid, which features both cash and share exchange options for Comten shareholders. Comten shareholders can receive $26 dollars per share or opt for NCR stock. The exchange ratio has been set at between .34 to .40 shares of NCR for each share of Comten.

The final exchange ratio will be based on the average of high and low prices for NCR stock for the 10 trading days commencing 15 days prior to the Comten shareholders' meeting, an NCR spokesman explained.

Up until Feb. 1, the date of the revised NCR offer, 31,430 shares of Comten stock had been tendered by shareholders, who will receive the $26 price, NCR said.

NCR filed with the Securities and Exchange Commission an extension of its tender offer to Feb. 13.

The acquisition is still subject to the completion of a definitive merger agreement and appropriate tax rulings.

Tektronix Combines Four Product Groups

BEAVERTON, Ore. — Tektronix, Inc. has realigned its organizational structure, consolidating its four major product areas under one group.

The Operations and Marketing Group, formed at the end of last month, combines the Information Display and the Test and Measurement groups under the direction of Lawrence L. Mayhew, now group vice-president. Mayhew's former position was group vice-president of Information Display. The Operations and Marketing Group consists of four divisions.

"Ten years ago, digital technology was primarily utilized in our information display products. Now the entire range of our product lines is impacted by microprocessors and other technological innovations. Our new organizational structure increases our ability to utilize such innovations," Mayhew said.

As part of the reorganization, Jon Reed, who formerly served as marketing manager for the Information Display Group, has been named director of corporate marketing, a newly created post.

Reed will coordinate both domestic and international marketing programs as well as direct corporate strategy and planning tasks, marketing research, contract development and other related functions.

Howard Mikesell was appointed general manager of the Information Display Division, which includes products such as graphics systems, terminals, plotters and hard-copy units. Prior to the reorganization, Mikesell was general manager of information display products.

The other three general managers and divisions are Tom Long, Communications Division; Larry Sutter, Laboratory Instruments Division; and Jim Towne, Service Instruments Division.

The product division structure provides coordination of engineering and manufacturing functions within major market areas with common interests, regardless of the mix of technologies within individual product lines, Mayhew said. With the growth of digital technology, the groups had been increasingly sharing technologies and markets.

PCMs Not Surprised by Announcement

(Continued from Page 103)

"will make some minor adjustments to our product strategy." He declined to elaborate, however.

Cambridge Memories, Inc. also is confident its plug-compatible systems, notably the 1638 (formerly known as the Model 3), will hold their own in the face of competition from IBM.

The Waltham, Mass., firm claimed its 1638 system is 20% to 25% faster than IBM's 4331 and offers up to 2M bytes of main memory compared with IBM's 1M-byte maximum capacity on the 4331.

But Kent Crombie, Cambridge's director of computer systems and marketing, said it was "too premature" to comment on how his firm will respond to IBM's aggressive pricing.

IBM's low hardware prices may be deceptive, he said, noting that up to 50% of monthly system costs would be for software. "We have to know what software prices are to really know the total system cost," he maintained.

Memory Price Snag

Because 4300 series software is compatible with 370 software, one fledgling 370 PCM, Citel Corp., claimed it would have little problem building a processor that would be cost-effective and compatible with 4300 models. However, in order to do so, "the memory pricing problem has to be overcome," according to Larry Taylor, Citel's president.

"The use of 64K memory chips will make a reduction in memory prices feasible, but right now they are in short supply. It will be late this year before anyone will come up with an attractive deal on add-on memory," Taylor lamented.

For the present, Citel plans to deemphasize its Models 3 and 4 — originally intended as 370/138 and 370/148 replacements — and instead stress its Model 5, an IBM 3031 replacement.

As for the mainframers, few would talk about the 4300 announcement. A spokesman for Honeywell, Inc. said company executives were evaluating the IBM offerings, which impact Honeywell's Series 60 Model 64, the high end of the 62 and the low end of the 66 models.

Univac could not be reached by press time, and both NCR Corp. and Burroughs Corp. refused to comment.

NCC '79: THE COMPLETE COMPUTING EXPERIENCE

The 1979 National Computer Conference will provide the year's most comprehensive computing experience. You'll see the industry's newest products and services and have the chance to speak with experts in every area of information processing. NCC '79, June 4-7 in New York City, will feature more than 120 sessions, a record-breaking exhibition, a Personal Computing Festival, Professional Development Seminars, and a variety of special events.

Preregister now to insure fast and easy access to NCC activities. Regardless of the registration category you select, your badge will be mailed to you well in advance of the conference. To preregister, complete and return the coupon.

Practical solutions to data processing problems will be emphasized throughout the conference program. Major program areas will include applications, science and technology, management, and social implications. A special highlight will be three separate groups of sessions covering the use of computers for financial transactions, in law and public policy, and in health care.

The latest computer hardware, systems, and services will be on display at NCC '79 on all four floors of the New York Coliseum and at the nearby New York Hilton Hotel. More than 350 organizations will occupy nearly 1,700 booths, making this the largest exhibit of its kind ever assembled.

The Personal Computing Festival will feature program sessions and application demonstrations of interest to professionals, EDP specialists, and computer hobbyists. A major attraction of the Festival will be commercial exhibits devoted exclusively to personal computing.

The Professional Development Seminar program will consist of 15 one-day minicourses designed to increase professional skills and aid in career development. A separate fee of $50 will be charged for each course. Rounding out NCC '79 will be plenary sessions, a Pioneer Day program commemorating the 20th anniversary of COBOL, a computer stamp exhibit, and other high-interest activities.

For more information, or to preregister for the full conference, return this coupon.

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Executive Corner

• John S. Donnelly has joined Magnetic Controls Co. as vice-president. He is responsible for sales, marketing and engineering functions.

• Joseph M. Murphy has been named president of Teleprocessing Business Systems, Inc., succeeding John P. Burke, who will continue to serve on the board of directors.

Diva Enters Service Pact With CDC

EATONTOWN, N.J. — Diva, Inc. has entered into an agreement with Syntonic Technology, the electronics maintenance service of Control Data Corp. Under the terms of the agreement, Syntonic will provide maintenance for the 2,400 Diva installations in the U.S. and service all future installations.

Currently, Diva is "operating successfully" under Chapter 11, a spokesman said. "When you go into Chapter 11, users become nervous about what will happen to their installations."

The arrangement is a means of assuring that regardless of Diva's final fate, its customers will be able to obtain maintenance. At the present time, however, it seems that the beleaguered disk product maker will survive its financial difficulties, the spokesman added.

Syntonic is initially geared to handle Diva installations nationally from eight locations. The service network will be expanded as additional requirements evolve.

Directory Lists Arab Buyers

DALLAS — The recently released first edition of the *Arab Trade Guide* is a reference source identifying buyers of a variety of products in 11 Arab countries.

The directory includes a product index by country and a cross-reference of companies, country by country. Computer and computer-related products is one of the 188 product categories listed in *Arab Trade Guide*, according to Executive Services, the company marketing the directory.

The directory is published by N.H. Fanous, a former U.S. Commerce Department employee who is currently a consultant to U.S. companies doing business with Arab countries.

Information Listed

Information on the more than 2,000 companies listed in the directory includes such items as each firm's number of employees, principal business activity and the contact within the company.

Statistical data on each country's economics, language, exchange rates, gross national product, literacy rate, communications and major U.S. imports is also included in the directory.

The publication costs $75 (plus $2.25 for postage and handling) from Executive Services, 5744 LBJ Freeway, Dallas, Texas 75240.

Digicon to Standardize on VAX-11/780

HOUSTON — Digicon, Inc. plans to standardize its geophysical data gathering and processing systems around Digital Equipment Corp.'s 32-bit interactive VAX-11/780 computer.

The firm will use the VAX computer for internal use and will also configure systems around it for sale to petroleum companies — its major customer base, according to Patrick H. Poe, Digicon's senior vice-president.

Both internal and packaged systems will be used to collect and process seismic and other geophysical data used in the search for new oil reserves.

After a nine-month study of different systems, Digicon selected the VAX-11/780 for those applications because of its high processor speed and Fortran optimization, Poe said.

Digicon received its first VAX system in October. The system will be used initially to develop application programs; it will be upgraded to a fully operational production system by summer.

The final VAX-11/780 configuration of Digicon's system will include 4M bytes of internal memory, between 300M and 600M bytes of disk storage, 12 standard magnetic tape drives, an array processor, an output plotter and several CRTs.

He added that depending on customer requirements, Digicon will gather and process data for petroleum companies, sell complete computer systems, license application software or establish a computing facility staffed by Digicon employees at a customer site.

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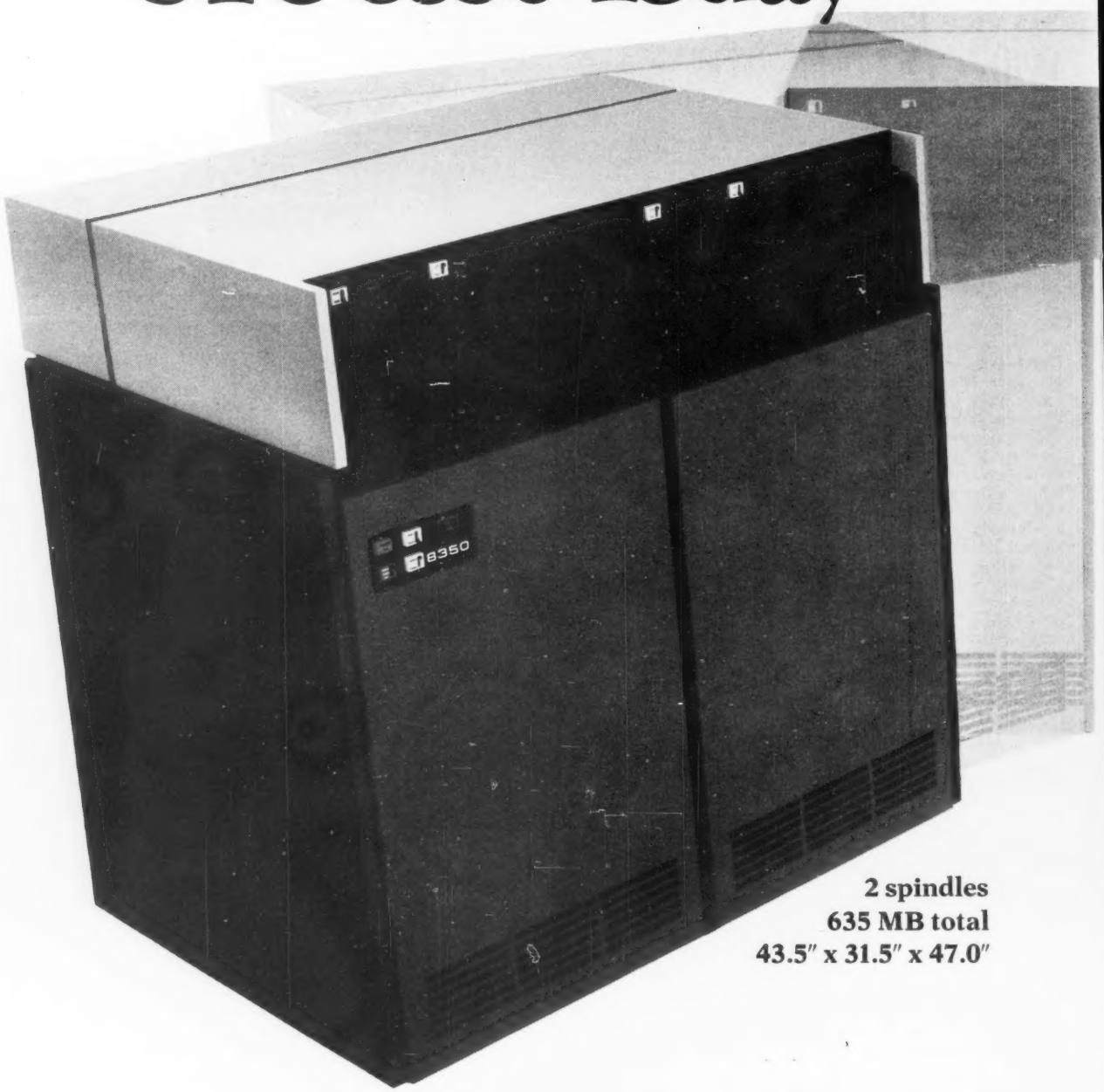

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The STC 8350 Disk Drive has posted an enviable track record for high performance, reliability and significant cost savings. All noteworthy reasons why it's today's leading 3350-compatible disk drive. And now there's another very important reason why you should consider an 8350: longevity. You save money now when you buy the unit, and our growth path protects your investment against obsolescence because you can double the capacity of your 8350 at a future date. Without doubling your cost. Here's how:

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The 8650 has more than met their objectives. It offers 635 MB of data storage per spindle. Double the capacity, yet it fits in exactly the same floor space as the 8350, has similar air conditioning and power requirements, and has no added components that could reduce reliability. And best of all, you get all these benefits at a lower price per Megabyte: about 30% less than comparable single density storage.

When we designed the 8650, we also designed a logical growth path for 8350 users: your unit can be upgraded to 8650 specifications whenever expanding data storage needs dictate doubling capacity. On your site, and at a very reasonable cost. That's why owning an STC 8350 today will be like money in the bank tomorrow.

How we achieved Double Density. The 8650 is a natural outgrowth of our experience in the research, design and manufacturing of high-performance fixed media disk systems. The 8650 double density disk drive, like the proven 8350, is an evolutionary product of our continuing research in winchester technology. It incorporates all that we've learned about head/disk relationships, flight dynamics, servo mechanisms and magnetic materials while becoming the leading independent supplier of fixed media disk. This knowledge, coupled with the STC certification process of stringent testing and inspection, has

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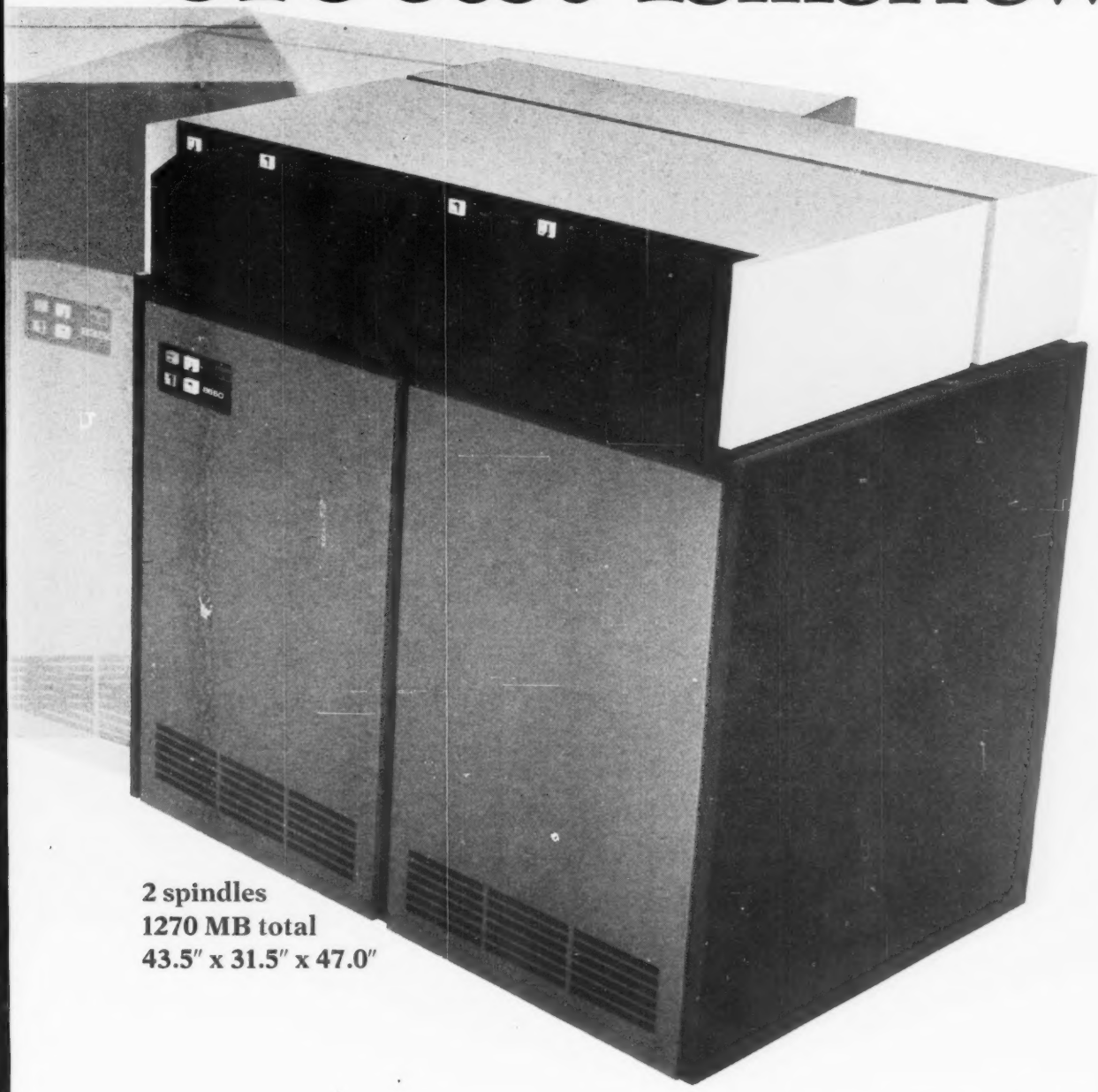

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Amdahl Net Up 26% in '78

SUNNYVALE, Calif. — Amdahl Corp. hauled in a 70% increase in revenues and 26% increase in earnings for 1978. Revenues totaled $320.9 million compared with $188.8 million in 1977.

Earnings climbed to $48.2 million or $2.81 per share compared with the $36.3 million or $2.22 per share earned in the previous year. The 1978 earnings were adjusted for the stock split; 1977 earnings reflect an extraordinary credit of $9.8 million.

For its fourth quarter, Amdahl earned $14.7 million or 85 cents per share compared with $8.6 million or 52 cents per share in the final quarter of 1977.

Doubled Spending

Amdahl expects shipments of its processors to expand significantly during 1979. Along with that growth, the firm reported it is planning to double its spending on product development and increase its leasing program this year.

While these moves will have some impact on 1979 earnings, they are necessary to benefit future revenues and earnings, a company spokesman said.

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Memorex Revenues Rise 41% in Year, 48% in Quarter

SANTA CLARA, Calif. — Memorex Corp. posted 1978 revenues of $633.3 million, a 41% increase from the $450.1 million revenues it reported last year.

Earnings for the year rose to $41.9 million or $5.64 per share; an extraordinary credit of $8.2 million boosted per-share earnings to $6.88. In 1977, earnings totaled $33.9 million or $5.22 per share prior to an extraordinary credit of $22.1 million, which increased earnings to $8.78 per share. Extraordinary credits in both years were from utilizing tax-loss carryforwards.

Earnings per share grew at a slower rate for the year and fourth quarter than in the comparable periods of 1977 because of the larger number of common shares and equivalents outstanding in 1978 and because of the higher dividend requirements on preferred stock, the firm reported.

For its fourth quarter, Memorex's earnings totaled $12.4 million or $1.56 per share compared with 1977 fourth-quarter earnings of $15.3 million or $2.35 per share. However, 1977 results included a tax-loss carryforward that added $5.8 million to earnings for that year. Fourth-quarter 1978 results did not include any extraordinary credit.

Revenues in the final quarter were $183.3 million compared with $124 million in the year-ago period.

Financial News

CDC Net Jumps 42% in '78

MINNEAPOLIS — Control Data Corp. boosted earnings 42% and revenues 19% during 1978.

Consolidated earnings for 1978 climbed to $89.5 million or $5.17 per share compared with $63 million or $3.65 per share a year ago. Net earnings for the computer portion of the firm's activities were $41.3 million, or 46% of total earnings, compared with last year's earnings from computer business of $20.1 million, which was 31% of total earnings.

Combined revenue for the year totaled $2.7 billion, with $1.8 billion, or about 70%, of that revenue derived from the computer portion of the business. Last year CDC posted revenues of $21.3 billion, of which $1.5 billion — 65% — was related to computer business.

For the final quarter of 1978, CDC had total revenues of $769 million compared with last year's fourth-quarter results of $650 million. The computer business for those quarters comprised 70% and 66%, respectively, of the firm's revenues.

Combined earnings for the fourth quarter were $24.2 million or $1.40 per share compared with $14.7 million in the year-ago period. For the final two quarters of both years, CDC's computer business comprised about 55% and 37.6%, respectively, of the total earnings.

All parts of the firm's computer business showed good growth, CDC said. Data services and education services revenue increased 19% to $395 million in 1978. The rental base of leased computer equipment rose 21%, reflecting strong demand for the Cyber 170 series.

OEM peripheral sales was the fastest growing sector of CDC's computer business, increasing 56% from last year's level.

Nickels & Dimes

Communications Satellite Corp. declared a dividend of 50 cents per share, its 34th consecutive quarterly dividend and the fifth at the 50 cent rate. The dividend is payable March 12 to shareholders of record Feb. 9.

$$$

Control Data Corp. will begin paying quarterly dividends on its common stock; the first quarterly dividend of 10 cents per share is slated for March 30 to shareholders of record March 2. "The new quarterly dividend is expected to pay stockholders at the yearly rate of 40 cents per share in 1979 compared with last year's 25 cents," William C. Norris, CDC chairman and chief executive officer, said.

$$$

NCR Corp. increased its quarterly dividend on its common stock 60%, from 25 cents to 40 cents per share. The dividend is payable April 27 to shareholders of record March 16.

$$$

Amdahl Corp. declared a quarterly dividend of 10 cents per share payable Feb. 21 to shareholders of record Feb. 1.

Computer Automation, Inc. reported that its unsecured bank credit line has been extended to $20 million, an increase of $5 million over its prior credit level.

$$$

Cray Research, Inc. has arranged a $15 million, seven-year revolving credit and term loan agreement with a group of six banks. The unsecured financing arrangement, at the prime interest rate, supersedes a previous $10 million credit line.

$$$

In recognition of its employees' contributions to the company's profitability, **Infoton, Inc.** recently awarded each employee 10 shares of the company's stock.

$$$

Environmental Research & Technology, Inc. (ERT) has accepted the cash acquisition offer made by **Comsat General Corp.** The price the wholly owned subsidiary of Communications Satellite Corp. pays will depend on ERT's audited 1978 earnings, but it will not exceed $20 million.

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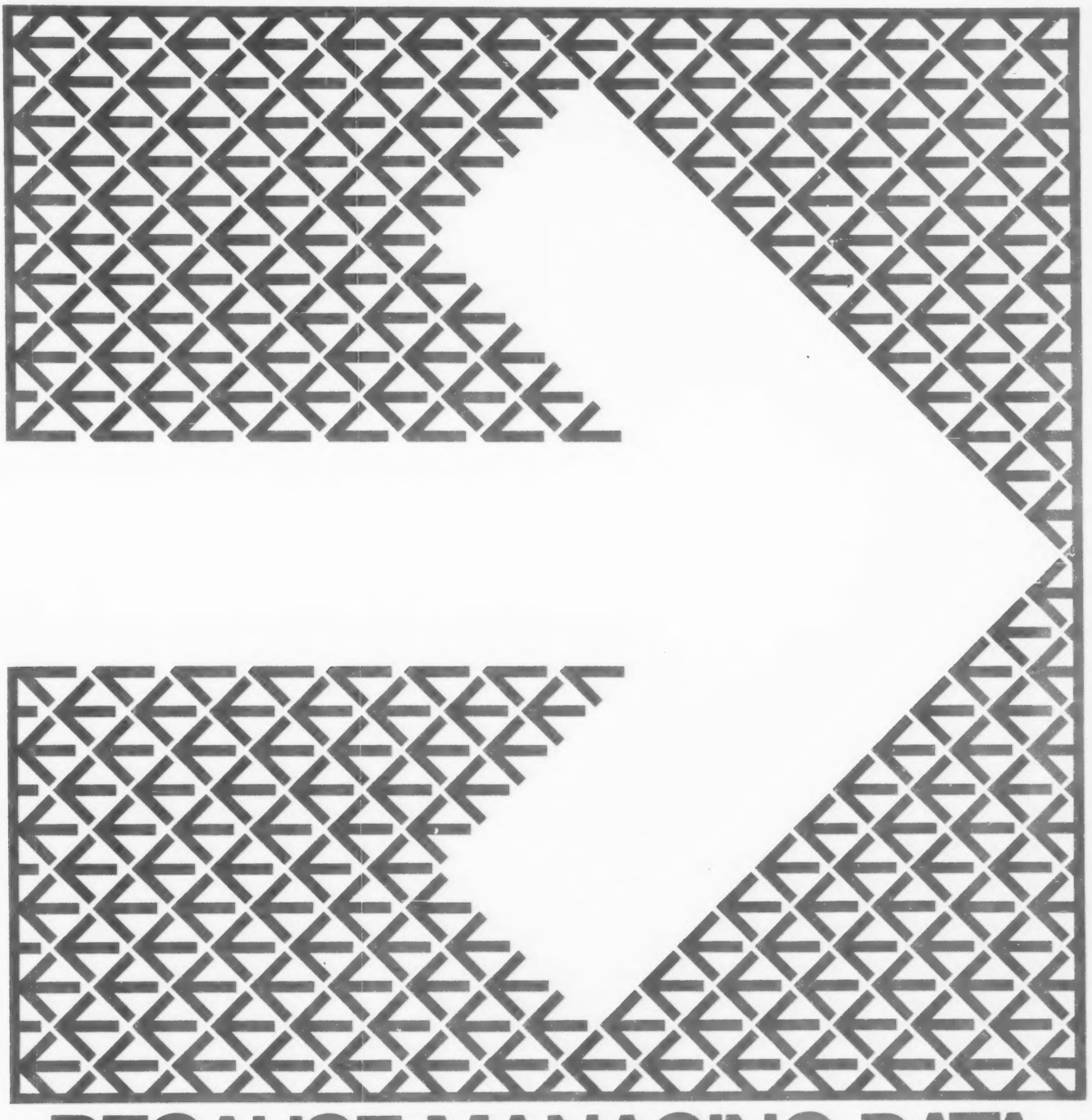

BECAUSE MANAGING DATA MEANS MANAGING CHANGE

Computer Corporation of America

SDS Hopes History Won't Repeat

By Marcy Rosenberg
CW Staff

Scientific Data Systems, Inc. (SDS) would probably disagree with those who say "history repeats itself."

Founded originally in October 1961 by Max Palevsky and others, the firm made its name when, in 1966, it introduced the Sigma family of mainframes primarily for scientific applications.

At the time, SDS chose not to lock horns directly with IBM, which had already captured a large chunk of the business DP market.

Because SDS aimed its well-directed marketing effort at a specific target — scientific, educational, time-sharing and real-time computer markets — the firm became one of the major success stories of the '60s — so much so that Xerox Corp. became interested in the company and was willing to pay $910 million for it in a three-for-two stock exchange back in '69. SDS agreed, and the deal was made in May, at which time SDS became Xerox Data Systems (XDS). In terms of sales, SDS was then a $100 million company.

Xerox, however, was not content to stay in the market SDS had carved out, but instead decided to take on IBM in business DP.

And it aimed to be profitable from the start.

The rest is history. When XDS began offering machines that could perform general DP as well as scientific functions and ventured onto IBM's turf, it had to respond to market pressures to offer its machines on a lease basis.

That's when it ran into problems of capital requirements and profitability. XDS started losing money in 1970 and by 1975, was expected to show a $44 million loss for the year.

By the summer of '75, Xerox decided to get out of the computer business, putting the XDS customer base up for bids. Interested parties included Univac, Telefile Computer Products, Inc. and Honeywell, Inc., which eventually got the spoils in January 1976.

Soon after XDS began its downward plunge, many of the SDS founding fathers left the company. Palevsky terminated his association with Xerox in 1972 when it was mutually agreed that he not stand for reelection on the board of directors.

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OUR TERMINALS HAVE IT ALL TOGETHER

Iranian Mart at Standstill

(Continued from Page 103)

accounts receivable on those contracts from prior periods totaled about $5 million, a spokesman noted.

General Automation, Inc., a new entrant in the Iranian DP market, expected to ship its first order for the company's 440 minis to Iran last month, according to Dennis Bress, manager of international distributor sales. However, the letter of credit from its Iranian distributor expired, and the distributor could not obtain another.

Iranian banking laws do not permit its banks to confirm letters of credit to foreign corresponding banks. Therefore, a vendor accepting an Iranian letter of credit must be confident that the Iranian customer can pay for the goods, a spokesman for the First National Bank of Boston said.

Because most U.S. vendors do not have production facilities in Iran, the financial impact of political developments has been minimal, an observer noted.

However, some U.S. vendors maintain company-controlled sales and service operations in Iran. Control Data Corp. has maintained such an operation there for more than five years.

Headquarters for that office moved to Brussels in January. Currently, CDC is providing maintenance for its Iranian installations.

"We are receiving payment for leased equipment and maintenance support services," a spokesman noted.

CDC also has a contract with the Iranian government to operate a vocational training school for computer personnel. That school is closed for the spring term, the spokesman reported.

At the height of its operation, CDC employed about 90 people, one third of whom were non-Iranians. The last non-Iranian employees left the first week in December.

IBM's subsidiary is attempting to serve customers in Iran as far as possible, a spokeswoman said. Nearly all of IBM's 300 employees there are Iranian.

IBM, which at the end of 1976 held about 68% of the Iranian computer market, (see Figure 1) declined to comment on the future outlook for the company's business there.

Last June, Univac established a joint venture, Univac Iran, with Iranian investors. That operation was just getting off the ground, a Univac spokesman said. Its non-Iranian employees, numbering less than 10, have been reassigned in Europe.

Whether and to what extent the computer market in Iran will recover is unknown, but until last year Iran was considered an important market for U.S. vendors.

Annual equipment sales to Iran were predicted to reach $12 million by 1980, according to the Commerce Department's Country Market Survey (CMS). Record sales of $17 million were made in 1976, CMS reported, attributing this windfall to heavy government spending.

Computer sales to the Iranian government constituted 45% of total computer sales and were expected to reach 50% by 1980 (see Figure 2).

Small business systems and minicomputers were the fastest growing segments of the Iranian market. A shortage of trained computer personnel was the limiting factor in the development of applications, CMS noted.

In 1976, Iran had 2,850 DP personnel. However, of those personnel 350 were programmers; 116 were analysts; 28 were software designers; and 12 were applications engineers. The bulk were operators or keypunchers.

	Number of units	Value ($ thousands)	Share of total value (%)
IBM	140	31,500	68.2
NCR	65	5,600	12.1
Honeywell	27	5,600	12.1
CDC	3	1,300	2.8
Univac	2	780	1.7
Burroughs	28	600	1.3
Data General	12	460	1.0
DEC	5	190	.4
Wang Laboratories	2	65	.2
Raytheon	5	50	.1
Computervision	1	50	.1
Total	290	46,195	100.0

Figure 1. The cumulative number and value of computers installed in Iran by the major suppliers are shown as of February 1976. This chart and the one below are reproduced from the Department of Commerce's Country Market Survey on "Computers and Peripheral Equipment: Iran."

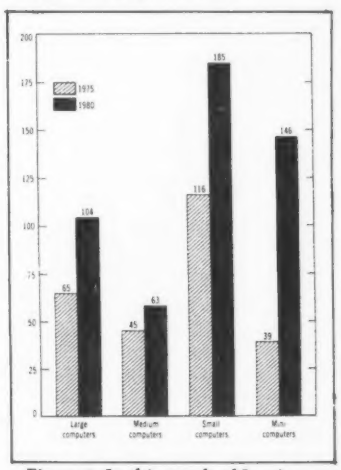

Figure 2. In this graph of Iran's computer population by size (1975 and 1980), computer size is based on memory capacity. Small computers feature up to 32K bytes; medium computers, 33k to 99K bytes; and large computers, 100K bytes and above.

Aims at 'Untouched Market'

SDS Resurfaces With Same Name, New Target

By Marcy Rosenberg
CW Staff

LOS ANGELES — Scientific Data Systems, Inc. (SDS) — the firm that made waves in the computer mainstream of the '60s with its Sigma series mainframes and later drowned after being sold to Xerox Corp. — has resurfaced, hoping to make more than a splash in new waters.

Yes, SDS is back with the same name and many of the same principals, but with different marketing ideas.

Unlike the SDS of old, whose pre-Xerox bailiwick was mainframe computers for scientific applications, the new firm will target its products for small business applications. It is "a relatively untouched market, particularly at the price we're offering," according to Jack Mitchell, president and one of the original SDS founders.

His company recently introduced its first product, the $8,000 SDS 420 microprocessor-based desktop system [CW, Feb. 5]. In about eight months it plans to bring out an MPU-based computer that will communicate with other 420s to comprise a multiprocessing network, Mitchell said.

That computer will be "dedicated to file management on a large mass store and will meet expansion requirements of 420 users," he added. This and other follow-up products "will allow us to serve larger companies and could end up being competitive with minis. You can go into a Fortune 500 company with a distributed processing network."

Advantages of Model 420

Concerning the SDS 420, Mitchell claimed the product "is at present the only fully professional small business system available for less than $10,000."

SDS compares the 420 to such systems as the Qantel Corp. 210, Cado Systems Corp. System 20 and IBM 5110, Mitchell said, noting that his firm's microcomputer system sells for about two-thirds the price of the first two systems "and less than one-half the 5110 price."

He claimed other advantages of the 420 over IBM's system, including faster disk access, double-density disk drives and a 12-in. screen. The 5110 has single-density disk drives and a 5-in. screen.

Asked how SDS could set such a low price tag on its system, Mitchell explained that the 420 was designed for automatic assembly. "The whole system, including disk and CRT controllers, main memory, keyboard interface and RS-232 interface, is contained on two printed circuit boards," he said.

In addition, the firm is not selling directly to the end user, but only through nonexclusive dealer and OEM contracts. "We don't feel we can support end users directly with the local support they need," Mitchell admitted.

SDS will train dealers in field service and will help them set up depots across the country for rapid turnaround on repairs.

"Service at the end-user location will be done on a component swap basis so the system can be up and running in five minutes," Mitchell said. "Components will be repaired at the local depot or at the factory."

Along with the 420 system, SDS will offer, through dealers, applications packages. The Basic, designed to run on microcomputers, that was purchased from Microsoft, Inc.

SDS will develop its own inventory control and word processing software packages and will purchase other packages from a local software house, which Mitchell refused to name. The purchased packages will include accounts payable and receivable, general ledger and payroll. Software prices have not been determined yet.

So far, SDS has signed one nonexclusive dealer contract with Ramdata, Inc. in the Los Angeles area. SDS is negotiating more dealer and OEM contracts, but has "no OEM contracts at present," according to Mitchell. The local dealer is offering minimum 18-month leases as well as selling the 420s.

SDS has sold 25 machines to Ramdata and one evaluation unit to an OEM. The 420 system was introduced in December, more than a year after the new SDS was incorporated in June 1977.

Six Prototypes

"You probably won't believe this," Mitchell said, explaining the delay, "but we were developing the product during that period. We developed six preproduction prototypes in 1977 to help us uncover all the problems in manufacturing and assembly. We didn't feel ready to announce it until the product was ready to go.

"We didn't have all our financing together until late '78, causing another delay," he added. Mitchell would not reveal the capital investment required to start up SDS, but said financing was obtained through a private placement to a group of 14 investors.

Investors include Max Palevsky, former president of the original SDS, and Arthur Rock, both of whom were among the firm's founders in 1961. Neither have operating positions at the firm.

Henry L. Herrold, also an original SDS founder, was named director of engineering of the new SDS.

Palevsky, Mitchell and William Scheding, who was named vice-president of programming, comprise the board of directors. Scheding was formerly in software development at Xerox.

Employees Own 50%

Mitchell said the new SDS is 50% owned by active employees, with the other half held by outside persons. "Some outsiders will be insiders before long, however, because we allowed some people that we want to employ to invest in a small way so they will have a vested interest in the company when they join," he noted.

Mitchell and some of the other original SDS founders left the firm after Xerox acquired it in 1969, but they kept in touch with one another.

Prior to reestablishing SDS in 1977, Rock was a venture capitalist, as he has been for the past 30 years; Mitchell was an independent consultant on microcomputers and disk controllers; and Palevsky was involved in movie producing.

While Rock and Palevsky are continuing those pursuits, Mitchell noted, "we all decided to get back into what we do best — building computers."

Supershorts

Information Dialouges, Inc. (IDI) agreed in principle to license Nixdorf Computing AG, Germany, to produce and market IDI touch-sensitive terminals with the German firm's computer equipment.

— — —

Generation Sciences, Inc. leased its system development generators to the Long Island Lighting Co., which will use the software for automated system development.

— — —

National Computer Systems, Inc. plans to purchase up to 50,000 of its 2,317,000 outstanding common shares to provide employee stock options and other compensation programs.

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American Firms Seen Misusing Japanese Reps

(Continued from Page 103)

than 100 systems houses active in Japan, 50 of which cover at least the three major Japanese market areas around Tokyo, Ogoya and Osaka. These cities comprise more than 75% of the market for computer products.

Real Difficulties

In the past, the U.S. Department of Commerce has been very efficient in identifying representative companies for U.S. computer industry firms. However, it is after the representative has been appointed that the real difficulties commence.

Often, immediately after a representative is appointed, a flurry of orders come in, and then sales quickly dry up. This is because the representative's organization is part of an associated group of companies, which buy samples of the product right away, but subsequently prove to be ineffective in selling these products to unaffiliated firms.

Robert Clark, head of the U.S. Trade Center in Tokyo, echoes this view. Clark noted that it is relatively easy to establish a representative relationship for computer products in Japan, but achieving successful results is entirely another matter. Clark remarked that his office is often beseiged by urgent telexes and telephone calls from U.S. companies asking his office to contact the Japanese representative to try to learn why sales are not developing as expected.

Four Major Errors

Japanese sales agents make four major mistakes in selling computer products and services:

- They fail to establish a favorable image for the company they represent.
- They don't make a sufficient number of personal sales calls to prospective companies.
- They don't spend enough time learning the applications capability of the products and therefore try to sell technical features rather than solutions to the customer's application needs.
- They are excessively concerned about the price of the products and fail to communicate to the customer the economic benefits of the product.

First, Japanese representatives must establish a favorable image for the quality of the foreign company's products. Such a favorable image, gained by exposure in the trade press and through advertising, is important to be "well-introduced" to the larger companies, which account for the majority of Japan's market.

Without a public relations campaign, representatives will often be limited to visiting the smaller enterprises, which do not have the capacity to buy in sufficient quantities to produce profits.

Technical seminars are also an excellent way to develop a favorable image and to qualify prospects. When possible, the senior U.S. technical personnel should be present at such seminars. The U.S. Trade Center provides meeting space for American companies that wish to conduct seminars in Tokyo.

Second, even after a favorable image for the company has been established, it often takes twice as many sales calls to get initial orders in Japan as it does in the U.S. This is because more people are needed to approve purchase recommendations. The Japanese "ringi" decision-making system involves people from the technical staff all the way up to the company's top management personnel.

But, to please the management of the U.S. company, Japanese representatives will often contact the higher management levels of a prospective company to make impressive sales call reports. While it is fine to maintain contact at the top management level, actual sales should focus on the operational management and technical staff in the prospective company, which make purchase recommendations to management.

Cultural Inhibition Problem

Cultural inhibition, the third mistake, is often the cause of the agent's inability to properly present his client's product applications. The Japanese agent is often reluctant to admit his sales personnel do not yet fully understand how the products help solve systems problems or aid in a computer installation.

Rather than sending personnel back to the U.S. for additional briefing and training programs, they will endeavor to get by with their current knowledge.

U.S. companies should monitor their Japanese representatives' activities in Japan, if possible by having their own personnel in Japan review the representatives' application knowledge and selling skills.

The fourth common mistake is excessive concentration on price negotiations. Japanese businessmen tend to focus on the cost of a product when, for computer products and services, it is the ability of the product to do the application that actually accounts for the order.

However, if the sales agent is swept up in the price discussions, he will often concentrate on price concessions and discounts at the expense of an appropriate analysis of the applications needs.

Because of the complex Japanese decision-making process, the actual selection of the product or service is based on approvals from virtually all people who will be affected by the prospective application. Their greatest concern will be application effectiveness, not price.

It is therefore not uncommon for the most expensive product to be the one selected, if it can perform most reliably and appropriately.

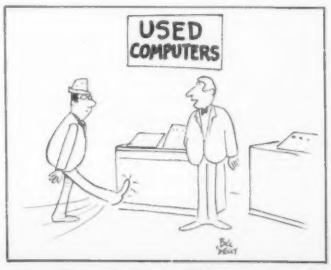
Japanese representatives tend to exaggerate the technical performance features of the equipment, rather than stress the transaction performance. When the products are delivered, the customer, although satisfied with the applications effectiveness of the product, is disappointed when the product does not deliver the technical features promised by the salesman.

Promising Prospects

Prospects for U.S. computer imports to Japan are considered very promising because of rapid growth in the Japanese computer market, which is increasing by more than 15% a year. Import tariffs for computer processors and peripherals are expected to decrease to 4.9% and 6%, respectively, in April. Currently, these tariffs are 10.5% and 17%, respectively.

IDC Japan is one of several firms offering to monitor the services of Japanese representatives. These services will help see that trading representatives achieve sales more quickly and establish a favorable image for U.S. companies. These tasks will be accomplished by product awareness studies and a review of the density and appropriateness of sales calls made by representatives.

Yuji Ogino is president of IDC Japan, a DP marketing consulting company.



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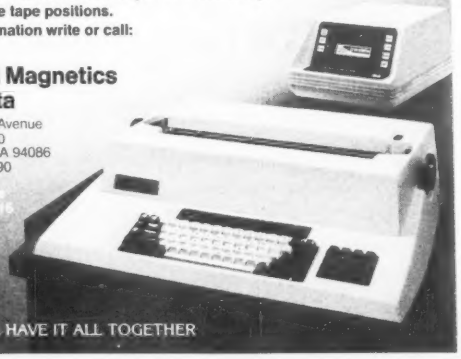


OUR TERMINALS HAVE IT ALL TOGETHER

Picked as Olympics Supplier

TI Produces Its 200,000th Data Terminal

AUSTIN, Texas — For more than one reason, Texas Instruments, Inc. is claiming to be an Olympian supplier of data terminals.

The first reason is that TI has produced its 200,000th data terminal — just 15 months after its 100,000th terminal came off the production line and some eight years after the firm introduced its first terminal models.

And the second reason is that it has been selected as official supplier of computer technology and calculators to the 1980 Olympic Winter Games in Lake Placid, N.Y.

TI's 200,000th terminal was the Silent 700 Model 765 portable bubble memory terminal. Introduced in April 1977, the terminal was touted as the first commercial application of magnetic bubble memories.

This terminal will be used at the Olympics to create event start lists from various Lake Placid sites. It was presented by TI as a commemorative unit to Ron McKenzie, president of the Lake Placid Olympic Operating Committee.

As winner of pregame terminal supplier tryouts, TI will also supply the Olympics committee with distributed processing hardware, software and a support network called the Texas Instruments System for Computerized Olympic Results and Events (TI-Score).

TI-Score will consist of dual DS990 minicomputer systems with communication links to Model 771 intelligent data terminals and to Silent 700 and Omni 800 terminals.

By linking the nine event sites with each other and to media and official headquarters locations, TI's support network will relay event competition results to judges and officials and to broadcast and press centers.

Other Orders

General Electric Co. has ordered 60 Series 60 Level 66 systems from Honeywell, Inc. The order is in the form of a rental agreement.

The Danville Division of Dan River, Inc. has ordered three Sycor 445 distributed data entry and processing systems having a total value of approximately $300,000. The systems will be used to process customer orders and disburse cash receipts as well as in other areas of the company's management information system.

The First Federal Savings and Loan of Gary, Ind., has purchased a Honeywell, Inc. Series 60 Level 66 general-purpose system valued at over $800,000.

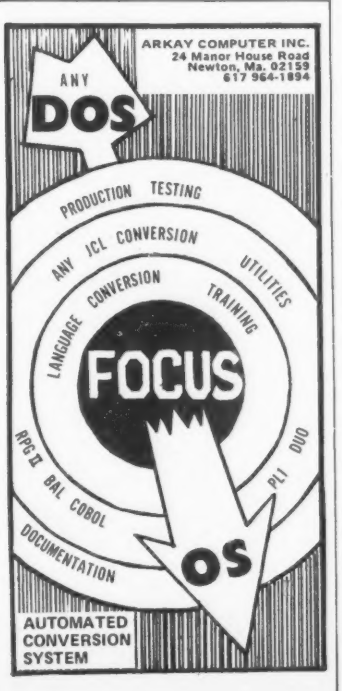
Affiliated Bankshares of Colorado has signed a $1.289 million order for Incoterm Corp. Series 7000 hardware, software and related services.

Automatic Data Processing, Inc. has ordered $25 million of HP 3000 series business systems from Hewlett-Packard Co.

Martin Marietta Aerospace has ordered computer-aided design and computer-aided manufacturing systems worth $1 million from Computervision Corp.'s Productivity Systems Division.

Orders & Installations

TI on Way to Olympics



Making use of terminal change

Data communications terminals are still growing in intelligence and function, and all the while becoming less and less costly. Which means a greater possible range of applications for the end-user — large and small. Getting cheaper components to do more and better things is indeed the watchword for today's terminal buyer and user.

Data Communications Terminals is the subject of our March 26 *Computerworld* Special Report. Edited by Ron Frank, this special supplement will be focusing on the buying and applying of data communications terminals, including topics like:

- *Criteria for terminal selection—shopping for applications as well as hardware*
- *RJE: Bringing reliability and data control to distributed networks.*
- *Network architecture: Creating a variety of service levels with multiple potential applications.*
- *Buying for the future: insuring flexibility for tomorrow's applications.*

If staying abreast of this rapidly changing field is a part of your job, you shouldn't miss our March 26 Special Report.

And if you're a manufacturer or marketer of Data Communications terminals or systems, your ad here would reach a large and interested group of readers. Ad close is March 9. Call your *Computerworld* representative for all details. Or, to reserve space for your ad, call Terry Williams at (617) 965-5800.

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TRW Gives Tymshare $2 Million Net Pact

CUPERTINO, Calif. — Tymshare, Inc. has signed a contract to provide a nationwide private data communications network for TRW, Inc.

The 20-node network, which will be installed this year, will cost TRW nearly $2 million. During the seven-year term of the agreement, additional revenue potential is available to Tymshare from sales of add-on equipment, maintenance support and enhancements to network software, a Tymshare spokesman said.

The network will link more than 30,000 users of TRW's credit services with a data base of consumer and business credit information.

Contracts

The network, which will replace a conventional system of communications processors, leased lines and multiplexers, will incorporate Tymshare's Advanced Communications Technology, according to Ernie Porcelli, vice-president of Tymshare's Data Network Division.

The key components of the Advanced Communications Technology are a microprocessor-based communications node processor called the Engine and operating software known as the Internally Switched Interface System (Isis), Porcelli said.

According to the terms of the contract, Tymshare will provide all network hardware and software, train TRW personnel to manage the network and provide additional Engines on an OEM basis.

TRW will be able to link its network to other U.S. networks and to international networks through a gateway node provided by Tymshare.

TRW has about 7,500 terminals in use for credit information inquiry. The credit information is stored in a data center featuring an Amdahl Corp. 470V/6 and an IBM 3033.

No software changes will be required to interface the network to the host CPUs, according to Tymshare.

Other Awards

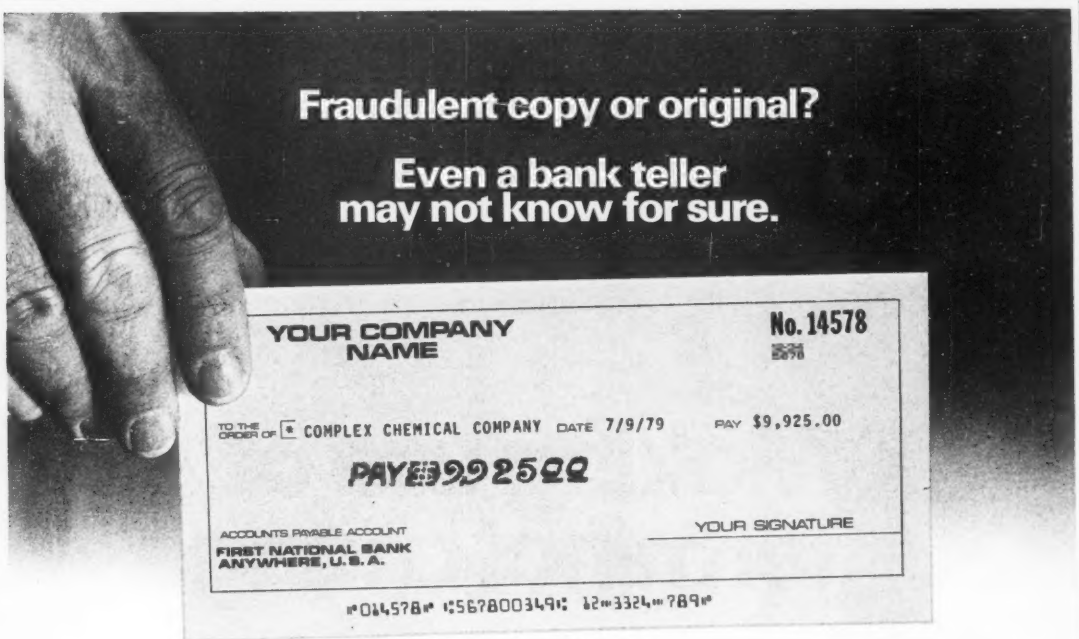
General Telephone & Electronics Corp. has been awarded a five-year contract by Paine, Webber, Jackson & Curtis, Inc. for its GTE Financial System One. The system will be installed in the brokerage firm's 149 offices throughout the country.

Several contracts worth $21.6 million have been awarded by the U.S. General Services Administration (GSA). Memorex Corp. received a $1.5 million order for tape, Wabash Tape Corp. got a $2 million contract for DP tape and Hewlett-Packard Co. gained a $6 million contract for data acquisition systems.

Chase Computer Corp. has received a contract from Busy Beaver Building Centers, Inc. for 145 Chase Model 2200 point-of-sale (POS) terminals and a quantity of Chase Model 2300 OCR-A readers. In addition, the company has purchased the Chase POS software package.

Itek Corp. has been awarded a $7.6 million Air Force contract for a system to track and identify space vehicles.

Anacomp, Inc. has successfully bid for a contract to develop a tax-processing system for the Illinois Revenue Department. Formal award of the contract is subject to completion of negotiations with the department.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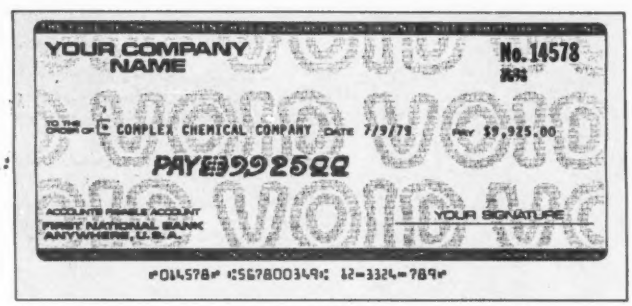

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50 Wholesale/Retail Trade
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75 Business Service (except DP)
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85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other _____

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12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
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Computer Architecture Designers and Microprogrammers

You have a good background in digital circuit design, preferably with some hands-on experience in designing computers for general purpose non-numeric computation. You have a basic understanding of systems software such as operating systems, compilers, or data base management systems and are interested in solving hardware/software tradeoffs. You have strong programming and microprogramming experience and are familiar with the leading microprocessors and their applications. If you have a background in systems design, networking, distributed processing, and especially peripheral interfacing, we want to talk with you.

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We're looking for capable individuals familiar with operating systems, compilers, data base management, or telecommunication systems, who enjoy creating lucid models and descriptions of otherwise complex structures. These positions offer excellent visibility and numerous possibilities for advancement within the corporation. Necessary qualifications include systems programming experience, competence in reading IBM 360/370 assembly language programs, good communication skills, and a desire for professional excellence.

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If you can offer a strong track record of successfully bringing new products to competitive marketplaces, we want to talk to you.

Write
JRM & Associates
P.O. Box 412, Spokane, WA. 99210

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Systems Analysts/ Programmers

--for a full conversion process--

Opportunities in both financial systems and manufacturing systems within our southern Westchester facilities. Hantscho – we feel – is one of the most prestigious names in the graphic arts industry and the demand for our printing presses has tripled in the last five years. Positions in financial systems require experience in cost acounting, payroll, accounts payable and order entry. Those in manufacturing require a knowledge of bills of material processing, inventory material control and shop floor control. Both areas require two years of programming preferably using NCR – NEAT/3. We are now running in a batch environment so that those who join the company now will be in on the ground floor in our conversion to real time. Exceptional salary, benefits, and relocation arrangements. Please call or send resume to: Brian Duffy, Systems Manager, (914) 664-7100.

GEORGE HANTSCHO COMPANY
30 Warren Place
Mt. Vernon, NY 10550
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DATA PROCESSING

ESCO Corporation

We are a leading Portland based firm manufacturing and distributing steel products throughout the world. Our data processing environment includes Burroughs 4800 series equipment and COBOL language. We are seeking progressive individuals as:

Systems Analyst
Two openings exist, one in manufacturing scheduling and the other in manufacture costing. Prefer experience in manufacturing systems and require experience in COBOL.

Programmers
Two openings are available working with our manufacturing cost programs. Prefer experience with manufacturing cost systems and requires experience in COBOL.

Send resume to:

Dave White
ESCO Corporation
2141 NW 25th
Portland, OR 97210
or call (503) 228-2141
ext. 500
equal opp employer m/f/h

PROGRAMMERS

South Florida Opportunities

Racal-Milgo, Inc., headquartered in South Florida is a world leader in the data communications field. In order to keep pace with our record sales and continued growth we have opened career opportunities at all levels for Programmers interested or involved in software development. These positions include the following:

SOFTWARE DEVELOPMENT

SYSTEMS PROGRAMMERS
These positions involve systems design and development of communications networks, familiarity with PDP-11, RSX 11M, RT 11 and microprocessor based systems. Intel 8080, 8085 experience is desired.

REAL-TIME APPLICATIONS PROGRAMMERS
Responsibilities include functional design and implementation of application related to the control of communications devices. This software will perform switching and controlling of communications network systems.

ENGINEERING PROGRAMMERS
Your involvement will include microprocessor operating systems design, communication software development, real-time software design, compiler design, terminal development, multiplexer software design.

APPLICATIONS PROGRAMMER
Should have a minimum of 2 years real-time assembly language experience in minicomputers or microprocessors, communications, teleprocessing, remote batch, IBM 3270/2260, Uniscope 100/200/400, VIP 7700 exposure helpful.

MANAGEMENT INFORMATION SYSTEMS

SYSTEMS SPECIALIST
Indi idual we are seeking should have 3 to 5 years systems analysis and programming experience with business applications utilizing ANS/ COBOL. Experience in Univac 1100 series and degree preferred.

DATA BASE ANALYST DESIGNERS
Duties include analysis design and development of data bases for both batch and on-line applications utilizing DMS 1100 data base management systems. You will also be responsible for training, consultation, performance measurements and optimization of data base designs.

To arrange for a confidential interview, call Rod Manning collect at (305) 592-5996 or (305) 592-5997, Monday through Friday, 9 a.m. to 4 p.m. If unable to call, please submit your resume in confidence to:

Racal-Milgo

8600 N.W. 41st St., Miami, FL 33166 (305) 592-8600

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THE SCHOOL SYSTEM

A comprehensive student services software package for elementary, high schools, colleges, and universities.

- includes scheduling, mark reporting, history maintenance, transcripts.
- flexible data-base design
- includes a Report Writer
- on-site demonstration available for 270 or equivalent system.

For more information call or write:
Mr. Bob Delf
Sales Manager
Columbia Computing Svcs. Inc.
621 Strander Blvd.
Tukwila, WA 98188
(206) 575-3612

PROGRAMMER LABORATORY SYSTEM

Atlanta, Georgia

Excellent opportunity for individual with working experience in any assembler language. Additional experience on IBM Series 1 and/or with EDX is desirable as well as basic knowledge of analytical chemistry and analytical instruments.

Send resume and salary history to:

The Coca-Cola Company
Corporate Recruiting and Employment
Department 1
P.O. Drawer 1734
Atlanta, Georgia 30301
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EDP NEW ENGLAND

INSURANCE

Syst/Prog 25K
Technical professional with excellent communications skills.

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Decisive, "results-oriented" individual to formulate technical strategies.

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Fee, reloc. pd. Forward resume, salary to:

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EDP Consultant
Fanning Personnel
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Hartford, Conn. 06103
(203) 247-3303

RIGHT FOR YOU

Programmers & Analysts

Large South Florida Financial Institution seeks Data Processing Professionals preferably with NCR and Financial Industry experience for following growth opportunities.

- **PROGRAMMER** - 2 plus years experience - knowledge of NCR NEAT/3 and COBOL programming languages, written communication skills.
- **PROGRAMMER/ANALYST** - 3 plus years experience and COBOL programming languages knowledge. Oral and written communication skills.
- **SYSTEMS ANALYST** - 4 plus years experience, good oral and written communication skills, project management capability.

Please send resume including salary history to:

FIRST FEDERAL OF BROWARD
P.O. Box 14370
Ft. Lauderdale, FL 33302
Attn: David G. Evans
Vice President
An Equal Opportunity Employer

MANAGER OF PROGRAMMING

SAINT JOHN HOSPITAL is currently seeking a qualified individual to manage the programming function in our Data Processing Department.

PROGRAMMING EXPERIENCE in COBOL and CICS/VS on or IBM 370 under DOS/VS is required. A Bachelor of Arts degree and hospital experience desirable.

WE ARE LOCATED in a pleasant east side suburban location. We have an excellent management salary and benefit package.

SEND RESUME with salary history to:

Mr. Robert Coffey
SAINT JOHN HOSPITAL
22101 Moross Rd.
Detroit, MI 48236

LEAD SYSTEMS PROGRAMMER

If you are an experienced Systems Programmer in a large OS/VS installation, and are interested in becoming a Lead Systems Programmer in a smaller installation, our Technical Support Manager would like to talk with you.

Our present environment includes data base and data communications systems supporting multiple locations from our Headquarters Office. You could play a key role in planning a distributed processing network for our branch office locations.

We offer a competitive salary and benefits, along with professional growth opportunities. Our Midwest, suburban location offers an ideal setting in which to live and work. If you have 3-5 years OS/VS systems programming, assembler, data base or data communications experience, please send your resume including current salary to:

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797 Washington St.
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LOOKING for a job in Juneau? Look here in Computer-world's classifieds.

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Major financial institution. 6+ yrs systems & quality assurance with development, standards & procedures, systems appraisal, capacity planing & software evaluation experience. Excellent career opptty with high visibility.

No travel, $29,000 Fee paid
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National opportunities for one to 5 years of IBM 370/158, 168 experience. We can find you the position you want, wherever in America you want to live. All expenses paid. Salaries $18,000 to $32,000. Send your resume to:
T.G. Barrett, President.

dp RECRUITERS
Data Processing
Recruiters
322 Groveland Ave.
Minneapolis, MN 55403
(612) 871-9144

COMPUTER PROFESSIONALS

Control Data Corporation has career growth opportunities in pre-sale, post-sale and consulting located throughout the United States.

APPLICATIONS

Applicants should have experience in one of the following areas:

- **PROGRAMMER/DESIGN ANALYSTS**

(Opportunities in Chicago, Cincinnati, Dayton, Los Angeles, Milwaukee, Minneapolis, Pittsburgh, St. Louis, San Francisco Bay Area, and Washington, D.C.)

COBOL, FORTRAN, BASIC
Interactive Information Systems
Quantitative Analysis
CDC 6600/7600, CYBER 70 or 170 series
IBM 360/360 OS, VS

- **DATA BASE ANALYSTS**

(Opportunities in Chicago, Detroit, Idaho Falls, Laramie, Wyo., Los Angeles, Minneapolis, Philadelphia, San Francisco Bay Area, and Washington, D.C.).

COBOL, FORTRAN
Total System 2000 IMS SPSS

- **SOFTWARE DEVELOPMENT**

(Opportunities in Chicago, Cincinnati, Dayton, Detroit, Indianapolis, Los Angeles, Milwaukee, Minneapolis, San Francisco Bay Area and Washington, D.C.)

Requirements Analysis
General and Detailed Design
Systems Analysis
Project Leadership
Information Systems Implementation
Knowledge of Time Sharing Usage

OPERATING SYSTEMS

Applicants should have experience in maintaining, modifying or extending any of the following operating systems:

- **CYBER 17X, 6000 or other large systems with NOS, NOS/BE, SCOPE, KRONOS, or OS**

(Opportunities in Albuquerque, Boston, Chicago, Cleveland, Cocoa Beach, Fla., Dayton, Detroit, Hampton, Va., Houston, Idaho Falls, Kansas City, Laramie, Wyo., Livermore, Calif., Los Angeles, Macon, Ga., Minneapolis, New York City, Philadelphia, Seattle, St. Louis, San Francisco Bay Area, Tulsa, Ok., and Washington, D.C.)

- **STAR 100A, CYBER 203 with applications or systems experience**

(Opportunities in Albuquerque, New Mexico and Butte, Montana)

- **System 370, 360 or OMEGA with DOS, VSI, VSII, SVS or MVS**

(Opportunities in Dallas, Detroit, Kansas City, Los Angeles, Minneapolis, New York City, Pittsburgh, Seattle, and St. Louis.).

- **CYBER 18 or other minis with 1700 MSOS, RCOS, ITOS or OS**

(Opportunities in Los Angeles, Minneapolis, New York City, Omaha, San Antonio, San Francisco Bay Area and Washington, D.C.).

or have extensive assembly language on any of the above computers.

COMMAND AND CONTROL

- **SYSTEMS ENGINEERS/PROGRAMMERS**

(Opportunities in New Jersey Shore, Hampton, Va., San Diego, Calif., and Washington, D.C.)

Command control design H/W, S/W, F/W, Programming and check out, Training, planning and systems design

Interface engineering and integration, Documentation and technical writing, Electronic switching

If you have experience in any of the above areas, we have openings located throughout the U.S. For immediate consideration, please send resume, salary history and geographical preference to:

John N. Powers at the address below

CONTROL DATA CORPORATION
More Than A Computer Company

60 Hickory Dr., Waltham, Mass. 02154
OR CALL COLLECT:
(617) 890-4600, ext.245

An Affirmative Action Employer M/F

PROGRAMMING

SENIOR PROGRAMMER ANALYSTS SENIOR SYSTEMS PROGRAMMER

Rexham Corporation, a large NYSE manufacturing firm with corporate headquarters in Charlotte North Carolina has immediate openings for two Senior Programmer Analysts and a Senior Systems Programmer each with 3 or more years experience.

Our challenging environment includes:

- Centralized corporate data center serving 20 remote locations.
- Univac 90/60 computer system currently expanding to provide new system in FINANCIAL and MANUFACTURING areas.
- Small core of computer science professionals dedicated to installation of quality software.
- Opportunity for growth with a young department in a dynamic company.

We require:

- A Bachelors degree in mathematics, computer science, engineering, or a related field.
- Fortran and Assembler experience for System Programming.
- Cobol, JCL and file structure experience for application programmers.
- Prior experience with Univac VS/9 or IBM 370/OS a definite plus.

These positions offer excellent salaries commensurate with skill and experience, good benefits and outstanding opportunity for professional growth and development. Send full resume including salary history to:

Rexham CORPORATION
PERSONNEL MANAGER
P.O. Box 4068
Charlotte, N.C. 28204
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PHILADELPHIA DP MANAGERS

We have been retained to recruit several top level managers by outstanding Philadelphia clients.

IBM 370 **To $32K**
Listed MFGR seeks 5+ years exp in design & installation of MFG APPS (MRP, WIP, INVENTORY CONTROL). Superior articulation and strong leadership reqd to direct 100 person shop. DEGREE HELPFUL/NOT REQD.

UNIVAC 90/30 **TO $30K**
Suburban svc co reqs 3 years supvy exp in 90/30 envirn. Direct 12 prog/analysts, operators. EXCEL FRINGE PKG.

SYS 34/RPG II **TO $25K**
RPG II pro with prior mgmt exp will find challenging LEADERSHIP POSITION supervising 4. Implement controls and direct dept expansion. BUILT-IN CAREER GROWTH.

For full details of this & other fee paid positions, please call for immediate interview appointment or forward resume to

ROBERT HALF
PHILADELPHIA, INC.
2000 MARKET St. Suite 706
Philadelphia, PA 19103
(215) 568-4580

PROGRAMMER/ ANALYST

The City of Colorado Springs is recruiting for this new position within its Department of Public Utilities, Gas Division. Requires a Bachelors Degree in Computer Science and 3 years experience working with hi-level languages and programming minicomputers and microprocessors or the equivalent combination of education and experience. Previous programming experience with a gas utility company highly desirable. Salary range $1369-$1586 per month depending on qualifications and experience. **Submit resume by March 2, 1979 to the City of Colorado Springs, Personnel Department, ATTN: Linda Klein, P.O. Box 1575, Colorado Springs, Colorado 80901.**

A move to Colorado could mean a market planning career with STC.

Storage Technology Corporation is the world's largest manufacturer of high density tape data storage products and a major manufacturer of disk subsystems.

We have built our reputation on innovation and advanced technology. Our rapid, stable growth gives us an incentive to constantly improve our product line and it gives you greater opportunity for advancement.

We are looking for an individual to plan the market and product requirements for future tape, disk and systems products. You should have 5 or more years computer experience, in areas such as IBM system engineering, systems programming, PCM planning or PCM support.

You will be able to make a major contribution to product/systems directions for our ever growing product line, and enjoy the lifestyle that only Colorado can give you.

STC offers an excellent salary range and benefit package, including a stock purchase plan.

Make a move up to STC and Colorado. Send your resume in strict confidence to:

Dale Muth
Dept. CW/2-19
MD-13

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2270 South 88th Street, Louisville, Colorado 80027
We are an equal opportunity employer M/F

Data Processing

DATA PROCESSING PROFESSIONALS

Denver Openings

Stearns-Roger, known throughout the industry for the engineering and construction of heavy industrial facilities has immediate openings for the following:

ANALYST/PROGRAMMERS

Must have 3-5 years experience with COBOL or PL/1. IMS or on-line experience helpful. Knowledge of O/S JCL required.

SYSTEMS PROGRAMMERS

This position requires experience with MVS or SVS operating systems; system generation, and system performance measurements. Must have ability to assist application users in problem determination due to both user errors and system errors. Knowledge of SMP and TSO desired.

MINI-COMPUTER PROGRAMMERS

Programmers for Honeywell Level 6. Background in Assembler language required. These positions involve data entry applications and operating systems development.

If you qualify, this is your opportunity to move UP with Stearns-Roger and enjoy all beautiful Colorado has to offer in outstanding climate and recreational activities.

For additional information call Willie Carillo, TOLL FREE 1-800-525-8043, and discuss your career objectives, or send resume including salary history in confidence to STEARNS-ROGER, P.O. Box 5888, Denver, Colorado 80217. We are an equal opportunity employer m/f.

You've heard about us.
Now we'd like to hear about you.

Stearns-Roger

ANALYST, TECHNICAL SYSTEMS

Designs and programs a variety of engineering and specific programs utilizing ANS-COBOL for application on UNIVAC 11 equipment.

Requires a BS in mathematics, computer science or related discipline with a minimum of 3 years of scientific and/or business programming utilizing data base methodology.

For confidential consideration, send resumes indicating salary history to: Dave Tanzer, Employment Manager, Martin Marietta Aerospace, P. O. Box 29304, New Orleans, LA. 70189.

We are an equal opportunity employer m/f.

MARTIN MARIETTA

MANAGER COMPUTER OPERATIONS

We are a Chicago-based division of a Fortune 500 corporation currently seeking a qualified individual to manage our 370/145 operation.

We require 5-8 years experience in DOS/POWER operations, the ability to train staff and establish management ability. Software experience with DOS, POWER, CICS and DL/1-VSAM is helpful, but not mandatory.

Your responsibilities will include supervising 4-7 operations people on 3 shifts, maintaining daily through yearly computer production schedules, establishing and maintaining I/O schedules and reviewing output reports for appropriate data. You will also deal with hardware and software vendors, oversee report distribution and aid the Programming staff in software areas.

We offer the qualified candidate a salary commensurate with experience and ability, a comprehensive package of fringe benefits and an atmosphere conducive to personal and professional growth. For consideration, please submit your resume, including salary history and current requirements, to:

P.O. Box 41505
CHICAGO, IL 60641

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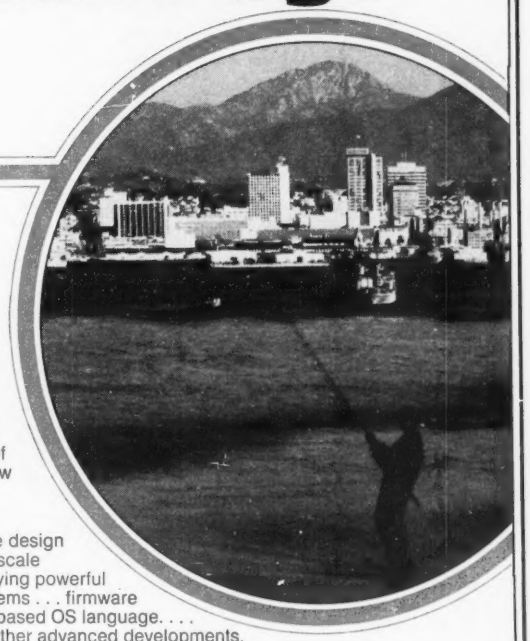
There are professional opportunities on a large scale at NCR/San Diego



You'll find the facilities themselves impressive: extensive buildings that cover a whole hilltop overlooking one of California's most attractive living and recreational areas.

Even more impressive is our aggressive leadership in computer technology. From the advanced work of professionals here, two new NCR divisions have been generated.

NCR/SD is engaged in the design and construction of large-scale computer systems embodying powerful new concepts: virtual systems . . . firmware emulation . . . PASCAL — based OS language. . . . VLSI technology . . . and other advanced developments.

The work we do has a strong impact on NCR's market position, provides high visibility for professional achievement, and offers experience in the new computer technologies that we are using to anticipate business EDP needs in the 80s.

If you are thinking big about your future, want to work in one of the most exciting environments in the industry, check the areas of interest below.

Immediate openings in many areas: If you have an engineering or computer science degree (or equivalent) and a year or more of experience in one or more of the areas listed, contact us at once.

SOFTWARE OPPORTUNITIES:

- **Distributed Network Architecture**
- **Transaction Processing**
- **Interactive Processing**
- **Data Base Design**
- **Performance Measurement & Analysis**
- **Configuration Management**
- **File Access Methods**
- **Operating System Development**
- **Compiler Design/Development**
- **Firmware Development**
- **Diagnostic Programming**
- **Test Systems Development**
- **MICR Proof Of Deposit Software**
- **Systems Architecture**
- **Tools Support — time-sharing — compiler designs/developments (high-level block structured languages) — SW tools design**
- **Distributed Intelligence Architecture/Interactive Systems Software Architecture**
- **Fifth Generation OS Architecture/ Interactive Systems Software Architecture**

Mr. George Rice, Manager, Professional Placement, Engineering and Manufacturing, Dept. H50, NCR Corporation, 16550 W. Bernardo Drive, San Diego, California 92127.

NCR

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370/158 OS MVS TSO IMS (VSPC PLANNED) DATA COMMUNICATIONS PLUS DEC SYSTEM 10 TIMESHARING ENVIRONMENT

Outstanding high technology engineering/manufacturing client corporation has these new hiring needs: Are you here?

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SR. SYSTEMS PROGRAMMER (CONSULTANT)

PROJECT LEADER - APPLICATIONS

PROGRAMMER/ANALYST (50-50)

Salary ranges mid 20's to low 30's to start plus full relocation
Call Collect (603) 926-6712
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Managing Partner

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If the good life is important to you, move your data processing skills to Wisconsin. In the midst of trees, lakes, fresh air, you will find professional data processing departments needing you and offering you opportunity to further your career. Backgrounds and experience of every kind are needed. For a SELECTIVE CONFIDENTIAL search, call LEOTA ESTER, Northeast Wisconsin's Data Processing Specialist for 7 years, (414) 731-5221. Send resume to:

MANAGEMENT RECRUITERS
225 N. Richmond St., Suite 202
Appleton, WI 54911

DATA BASE ADMINISTRATOR

Major Phoenix Company has an immediate opening for a highly qualified Data Base Administrator/Manager with experience in the initialization in continuing operation of DL/1.

We offer excellent benefits and growth potential. Send your resume and salary requirements to:

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TOP PROFESSIONALS ARE KNOWN BY THE COMPANY THEY KEEP

We're ATEX, only five years old yet already a leading producer of large computerized text, editing and composition systems. The expertise and capabilities of our professional staff are recognized and respected throughout the publishing and printing industry. These positions are in new groups which are being formed within ATEX.

PROGRAMMERS
ADVERTISING MANAGEMENT SYSTEMS

We need several systems and applications programmers for the development of a newspaper page dummying system including a transaction oriented display ad data base, automatic ad placement and pyramiding and an interactive graphic correction terminal. The individuals we are looking for will have experience in minicomputer systems and applications programming for turnkey systems. Use of assembly language and high level languages, especially PASCAL desirable.

PROGRAMMERS
EDITORIAL PAGINATION SYSTEMS

We need several systems and applications programmers for the development of an interactive graphics system for the layout and pagination of a newspaper utilizing PDP-11 minicomputers and state-of-the-art 16 bit microprocessors. The individuals we are looking for will have experience in mini-computer systems and applications programming for turnkey systems. Interactive graphic programming desirable along with use of assembly language and high level language, especially PASCAL.

PROGRAMMERS
INTERACTIVE TEXT PROCESSING AND PUBLISHING SYSTEMS

We need individuals for coding, debugging, and documenting applications programs for interactive text processing and publishing systems. Programs will be written in MACRO assembly language to run on DEC PDP-11. Applicant should have a degree in computer science and/or engineering with 1-3 years of experience.

SOFTWARE SYSTEMS ENGINEERS

Responsible for installing and supporting sophisticated real-time interactive text-editing systems, you will test software, design system refinements and solve customer systems problems. Previous experience with PDP-11 assembly language is required. Experience with printing and publishing applications is a plus.

Because of our growth posture, we have and anticipate many other opportunities on a variety of levels. Please send your resume and salary requirements, in confidence, to Stephen Pitt, Director of Recruiting, or call him at (617) 275-8300.

atex

15 Wiggins Avenue, Bedford, MA 01730
An equal opportunity employer m/f/h/v

PROGRAMMER ANALYSTS
Variety is a Key Factor with AiC

Analysts International Corporation offers you a stimulating environment for personal and professional growth through exposure to a wide variety of assignments and state-of-the-art technology. We provide our client companies with quality services in systems design, software consulting, and programming.

AiC branch offices are located in Atlanta, Bismarck, Chicago, Cleveland, Dallas, Denver, Detroit, Houston, Huntsville, Kansas City, Los Angeles, Mpls/St. Paul, Philadelphia, San Francisco, Seattle, St. Louis and Tulsa.

POSITIONS OPEN CURRENTLY

Due to continued expansion, we have need for personnel with the following backgrounds:

- **ATLANTA:** 3+ yrs. exp. on Systems 3 and/or 34.
- **BISMARCK:** COBOL on Honeywell 66/40 and/or Level 6 minis. Data Base Mgmt. or public utility exp. desirable.
- **CHICAGO:** 4+ yrs. exp. in COBOL, Assembler or other languages on applications or systems programming.
- **CLEVELAND:** 5+ yrs. programming in RPGII using CCP.
- **DALLAS:** 3+ yrs. in COBOL and/or ALC with CICS or IMS... banking, insurance or manufacturing applications.
- **DENVER:** 3+ yrs. programming/analysis in CICS or PL/1. 3+ yrs. PARS/ACP.
- **DETROIT:** IMS applications exp. using PL/1 or COBOL. RPGII using CCP.
- **HOUSTON:** 3+ yrs. exp. in production and inventory control systems... oil and gas industry exp. desirable.
- **HUNTSVILLE:** 3+ yrs. programming in RPGII... CCP desirable.
- **LOS ANGELES:** CSC INFONET applications development. Sr. consultant to perform requirements analysis. Mini applications development.
- **MPLS/ST. PAUL:** 3+ yrs. COBOL or FORTRAN with CICS and/or Data Base Mgmt.... business or engr. applications.
- **SAN FRANCISCO:** 2+ yrs. IBM OS maintenance and fine tuning on 360/370.
- **SEATTLE:** HP 3000 and/or Honeywell 6000 GELCOS COBOL programmers. (For Portland, Oregon: 2+ yrs. ADPAC on IBM 360-OS, PDP-11 series DIBOL.)
- **ST. LOUIS:** OS-IMS applications exp. communications controller internals.
- **TULSA:** 3+ yrs. COBOL on IBM 370 with IMS... CICS desirable.

OTHER NATIONAL OPENINGS

Most of our branches have need for quality personnel with 3+ years experience in several of the following areas: proficiency in more than one high level language (including COBOL); systems design experience; large or small systems experience; on-line and/or Data Base experience.

If your qualifications resemble the above requirements and you are contemplating a change in the next four months, we'd like a chance to visit with you. Our salaries and benefits are competitive. We also encourage project consultants to apply.

For confidential consideration, send your resume (including salary history and geographic preference) to:

Jerry I. Buegler
Analysts International Corporation
7615 Metro Boulevard
Minneapolis, Minnesota 55435

AiC ANALYSTS INTERNATIONAL CORPORATION

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LIVE, WORK & PLAY IN
NEW HAMPSHIRE

Appealing? Tired of high taxes and expressway jams? If so, growth and expansion in NH has created new demands for D. P. Professionals. Immediate needs are for Programmer Analysts with a COBOL background along with Data Base, CICS, and DL/1 knowledge. Equipment doesn't really matter. Other positions for Systems Analysts and Management Personnel come up often. **For consideration on any of these positions, forward your resume or call: David J. Osgood, CEC, Vice President.**

availABILITY.
Personnel Consultants
160 S. River Rd., Bedford, N.H. 03102
603/669-4440

SENIOR DATA PROCESSING EXECUTIVE

A take charge, production oriented Data Processing professional is needed to head up the Data Processing operation of a medium sized, New England based, casualty-property insurance company.

The successful candidate will be responsible for long range planning, programming & development, manual systems, operations, data input and other processing units.

The company currently leases an IBM 370-148, DOS/VS, however, a switch to OS is planned for later in the year. Department staffing is about 100, annual budget approximately $2 million.

Candidates should have experience in Insurance Systems, as well as management responsibility for an operation of similar size & complexity.

Please address inquiries and resumes to:
CW Box 1831
797 Washington St.
Newton, MA 02160
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position announcements | position announcements | position announcements | position announcements | position announcements

FLIGHT TEST ENGINEERS

McDonnell Aircraft Company has immediate openings for engineers experienced in Flight Test data systems applications. Career opportunities include development, operation and support of Flight Test data systems on F-15, F-18, AV-8 and advanced aircraft projects in one or more of the following applications.

- **Mini-Computer Technology**
- **Computer Programming**
- **Flight Test Data Assessment**
- **System Design**
- **Airborne Instrumentation**
- **Installation Design — Electrical & Mechanical**
- **Electronic Circuit Design**
- **Micro-Processor Technology**

Please send your resume in confidence to:

W. B. Kellenberger
Section Manager,
Professional Employment
Department CW-04
P. O. Box 516
St. Louis, Missouri 63166

MCDONNELL DOUGLAS
An Equal Opportunity Employer
CORPORATION

EXPANSION NEEDS

NEW ENGLAND MANUFACTURER Has Several New Openings:

PROJECT LEADER – BUSINESS SYSTEMS

Project responsibility for design and installation of Accounting and Business systems. IBM 370/OS, COBOL exp required.

PROJECT LEADER – MFG SYSTEMS

Design and installation of Mfg and Business systems. COBOL req'd. Exp in Mfg Processes and Production Control helpful.

PROGRAMMER/ANALYST (2)

Expansion - created openings involved with implementation of new business and mfg applications. Minimum of 2 years COBOL experience. Large scale IBM background helpful. Either Insurance or Mfg background will be considered.

Company pays all Fees, Interview and Relocation Expenses.
Send Resume or call (collect) A.J. Rachele at:

DYNAMIC PERSONNEL SYSTEM

SPECIALISTS EDP PLACEMENT

181 Park Avenue
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NCR NEAT/3 PROGRAMMER

Experienced NCR Century Programmers. Salary commensurate with experience. Excellent company paid benefits including free lunch and parking. Ample prime shift test time. Send resume or call:

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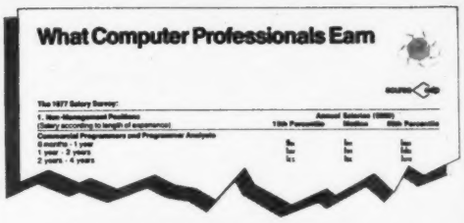

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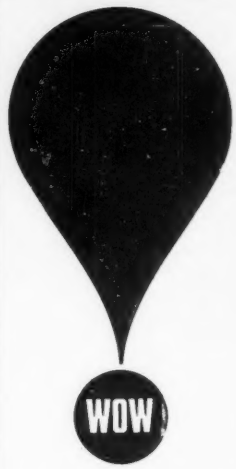

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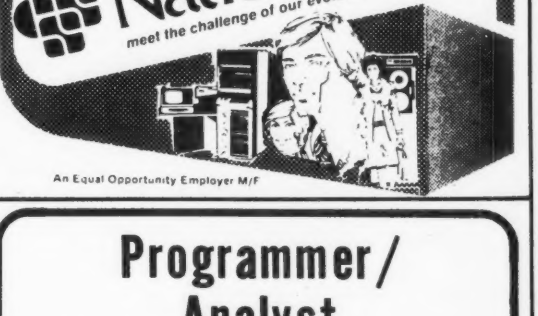

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BAR 76,320 x 4,260 - 106,140
(US$1 = HK$4.80 approx.)

Starting salary will depend on qualifications and experience.

Further particulars and application forms may be obtained from The Secretary-General Association of Commonwealth Universities, 36 Gordon Square, London, WC1H OPF, England, or the Assistant Secretary (Recruitment), University of Hong Kong, Hong Kong. Closing date for applications is February 28, 1979.

SYSTEM PROGRAMMERS

The City/County Joint Computer Facility in Salem, Oregon, is planning to have available a System Programmer position by March, 1979. The minimum requirements are two years experience installing and maintaining DOS/VS, POWER/VS, and CICS/VS and two years experience in IBM BAL. Experience in OS, DL1, and ANS COBOL are desirable. Our Center can provide the ambitious, self-motivated, System Programmer with current State of the Art Technology in both Hardware and Software. We provide considerable training and education.

Those interested in working in a progressive environment, plus the opportunity to live in the beautiful Pacific N.W. are invited to submit their resume and salary requirements to:

Marion County/
City of Salem
Computer Facility
690 Ferry St., SE
Salem, Or 97301
(503) 588-6351

SOFTWARE MANAGER

DATA GENERAL EXPERIENCE

Full Responsibility for Data Processing System

Developing Software on presently operational DataGeneral system of two C-330 and two S-130 Eclipse with 8 printers; 72 CRT, and four 100 MB Discs. On-line system is in Macro Assembler with Cobol for listings under MRDOS.

Requires knowledge of INFOS, MRDOS; AOS & Macro Assembler.

Very attractive salary; plus bonus; plus participation with fast growing corporation doing business nationwide.

Phone: **David Allen** Toll Free @
800-228-9288

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Omaha, NE 68102
402-345-4122

Application Systems Architect/Project Leader

We have just completed the general design of the most innovative patient billing system in the hospital industry. Our new billing system will be a component of our integrated on-line information system and its DL/1 patient data base. We need an individual who can organize and direct a project team in the detailed design and implementation of this system. The ideal candidate will have 5+ years experience in the design and implementation of large integrated on-linse customer information systems, not necessarily in the hospital field, e.g., retail, distribution, public utilities, etc. The canoidate will also have managed 4 or more people utilizing sophisticated project management and development methodologies.

We are a progressive MVS 158 AP shop with CICS-DL/1 supporting a 160 terminal hospital information system. We are located in a small midwestern city which enjoys the recreational, educational and cultural advantages of a large university. **Call me personally or send a resume including salary history to Barry T. Miller, Information Systems, University of Iowa Hospitals & Clinics, Iowa City, IA 52242. (319) 356-2432.**

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Highly qualified computer professionals are needed to fill a variety of richly rewarding data processing positions with the ITT Financial Corporation. Our rapidly growing data processing division located in Eau Claire, Wisconsin, offers you an excellent salary, generous benefits, and the promise of career advancement in return for your skills.

You will have the opportunity to develop and support business and financial applications for 6 ITT subsidiaries throughout the nation and Puerto Rico. You will enjoy the challenge of working on these problems with some of the best minds of the business and the best equipment available, including OS/VSI, DOS/VS, VM, CICS, RJE on an IBM 3031-3, and IBM 148-K.

SENIOR TECHNICAL ANALYSTS

Requires 4 years of ALC, Cobol Programming and considerable experience in IBM operating systems internals, utilities, hardware and telecommunications experience in an OS/VS-CICS or equivalent environment.

TELECOMMUNICATIONS ANALYSTS

Requires 4 years of experience in teleprocessing and communication problem identification and resolution, Modem and line testing, installation and maintenance of test equipment, and vendor contact and follow up.

PROGRAMMER ANALYSTS

Requires 4 years experience in Cobol or BAL programming for IBM hardware with 1 year of development experience in an OS/VS environment. A Degree in Accounting or Financial Analysis is desirable.

PROGRAMMER

Requires 1-3 years of programming experience in an OS/VS environment, coding proficiency in Cobol and/or ALC, and working knowledge of access methods and JCL.

LEAD & SENIOR COMPUTER OPERATORS

Requires 2-4 years of experience with IBM 148 or larger system using OS/VS or MVS with on-line support, and a good working knowledge of DOS or OS JCL.

FOR IMMEDIATE ATTENTION SEND CURRENT RESUME INCLUDING SALARY REQUIREMENTS TO:

Personnel Department

ITT FINANCIAL CORP.

BOX 250
Chippewa Falls, Wisconsin 54729
OR CALL: (715) 723-1851

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EDP PRODUCT SUPPORT SPECIALISTS

SYKES DATATRONICS is a fast growing, high-volume manufacturer/marketer of low-cost micro-computer based products for industrial, scientific and commercial markets. Our newest product line, Comm-Stor has created two openings for experienced product support people to work directly with sales personnel, distributors, and users.

Working with our Comm-Stor II (Communications Data Storage) and Comm-Stor IV (Programmable Communications Storage) units, you should be knowledgeable in data communications and peripheral equipment (modems, Serial RS-232 printer and input-output terminals). With Comm-Stor IV, you should also be capable of programming in basic computer language.

These Rochester-based positions offer rewarding opportunities for career growth, plus an attractive compensation plan, including full paid hospitalization and relocation expenses. 15% travel. Act now! Send your resume and salary history/requirements in complete confidence to:

Mr. Jerold D. Westfall
Product Support Group Manager
SYKES DATATRONICS INC.
375 Orchard St.
Rochester, N.Y. 14606
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Systems Engineer Analyst/ Programmer

If you have a solid record of achievement as a systems engineer/programmer, with strong technical knowledge and experience, you may be the person to complement our team of professionals.

We are located in the San Francisco bay area, and are part of NCR's national network of service bureaus and provide on-line, real-time services to the thrift community in Washington, Oregon, Nevada and California.

NCR is a leader in the data processing industry. As one of the most respected companies in the field, we offer competitive earnings, a comprehensive employee benefit program and an atmosphere where the challenge, reward and recognition are as great as any opportunity in the business world today.

We are seeking a person with a technical college degree or a business degree with computer sciences courses. In lieu of a degree, we will consider those with equivalent experience. We are also looking for a self-starting, enthusiastic individual with confidence and a high energy level.

You should have 2-5 years experience that includes support and maintenance in the Savings and Loan Field.

If you are successful in your present position and want to expand your potential, forward your resume and salary history to: Mr. J.W. Bono, Programming Manager, NCR Corporation, Data Processing Center, 1153 Triton Dr., Foster City, CA. 94404.

NCR
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ATTENTION

DATA PROCESSING PROFESSIONALS

Western Bancorp Data Processing Company

Western Bancorp Data Processing Company (WBDPC) has openings in all phases of data processing:

- Management
- Applications Programming
- Software Programming
- Operations

Western Bancorp Data Processing Company (WBDPC) is an affiliate of Western Bancorporation, the largest multi-state bank holding company in the United States. WBDPC provides daily data processing support to 22 Affiliate banks and their 800 banking facilities located in over 400 communities in the 11 Western States. This support is provided through 18 computer facilities located from Seattle, Washington to Hobbs, New Mexico and Los Angeles, California to Casper, Wyoming. Equipment varies from IBM 360/30 thru Dual MP168's and Burroughs B1700 thru Dual B4800's. This vast banking network is connected by the **Teller Item Processing System** (TIPS) with more than 3800 terminals currently online. TIPS is the most extensive online teller system in the United States and was developed in-house with the Airline Control Program (ACP) as the operating system. Major development efforts are under way to expand the capabilities of this network.

WBDPC offers an outstanding Benefit package, a competitive salary program and a strong retirement program.

WBDPC offers exciting challenges in:

Reno, NV., Denver, CO., Seattle, WA, Salt Lake City, UT., Tempe, AZ., Boise, ID., Portland, OR., San Francisco, CA., El Segundo, CA., Los Angeles, CA.

Availability of positions varies by geographic area. Forward your resume and salary requirements with geographic preference to:

WBDPC
Post Office Box 935
El Segundo, CA 90245
ATTN: Personnel Department
EQUAL OPPORTUNITY EMPLOYER

ENGINEERS

ENGINEERS WANTED TO DEVELOP AUTOMATED DESIGN SOFTWARE IN CENTRAL DATA PROCESSING GROUP

Denver Openings

Stearns-Roger, known throughout the industry for its engineering and construction of heavy industrial facilities, has immediate openings for the following:

CHEMICAL ENGINEER

This position includes development of Process Design Systems and user consultatation. Must have FORTRAN or PL/1 experience in development of Process Simulation Programs. Working knowledge of thermodynamics desired and Process Engineering experience helpful.

MECHANICAL OR CIVIL ENGINEER

Development of Structures Design Systems and user consultation included in this position. Must have FORTRAN experience in developing structures design programs and must be an experienced user of Finite Element Analysis Programs. Knowledge of codes helpful.

If you qualify, this is your opportunity to move UP with Stearns-Roger and enjoy all beautiful Colorado has to offer in outstanding climate and recreational activities.

For additional information call Willie Carrillo, TOLL FREE 1-800-525-8043, and discuss your career objectives or send resume including salary history in confidence to STEARNS-ROGER, P.O. Box 5888, Denver, Colorado 80217. We are an equal opportunity employer m/f.

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Now we'd like to hear about you.

Stearns-Roger

POSITIONS NATIONWIDE

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Openings too numerous to list.

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Seattle, WA 98111
Offices in Wash., D.C., Chicago, Atlanta, Portland, Or.

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National organization with responsibility for a nation-wide stock quotation system is currently expanding its data processing staff at its Trumbull, Connecticut location. We are seeking individuals with Assembler language experience on real-time systems.

Competitive salaries and benefits
Relocation expenses paid
Send resume with salary requirements in confidence to:

Mr. Al Casanova

National Association of Securities Dealers, Inc.

60 Merritt Boulevard **Trumbull, Connecticut 06611**
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If you are familiar with NCR equipment and have at least 3 years on-line programming experience using Neat/3 and Cobol languages under B-3 operating system, then we have an opportunity for you. Fast growing, multi-million corporation with excellent company benefits and opportunities for advancement. Salary commensurate with experience. Send resume along with Salary History and Requirements to:

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Connecticut & New England
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BANKING: SYSTEMS PLANNERS – Accounting b/g. a plus. To 24K; PROJECT LEADERS – on line development, 3-4 yrs. COBOL. To 23.5K; PROGRAMMERS – 3+ yrs. in financial applications. To 20K

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SYSTEMS ANALYST: 3+ yrs. in mfg. systems. Production control, MRP b/g. pref. COBOL. Investigate this growth spot with solid Conn. Company. To 25K

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HARDWARE/SOFTWARE PLANNING: Put your tech. skills to good use with Blue Chip company who seeks individual to provide the needed development expertise. To 28K

VENDOR SPLENDOR: Technical sales & support positions with top companies in computer hardware and software. Salary open + expenses.

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RPG II: The Great Escape to our solid manufacturing and business clients seeking programmer/analysts to work on IBM and Univac systems. To 20K

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Scientific D.P. Opportunities

Deere & Company, a leader in the agricultural and industrial equipment industry, has the following opportunities available:

Finite Element Structural Analysis

Your background must include a BS degree in Engineering, 2 years experience in finite element analysis using NASTRAN or similar programs. You should also be familiar with IBM JCL, IBM TSO, and FORTRAN programming.

Scientific Programmer

The individual we select for this opening will have 1-2 years experience writing engineering application programs in FORTRAN, along with a working knowledge of mini-computers. A BS degree in Engineering is required.

We offer competitive salaries, comprehensive fringe benefits that include paid relocation and opportunities for career advancement. Direct inquiries with salary history to:

JOHN DEERE

Ronald H. Like
Deere & Company
Moline, Illinois 61265

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A COLORADO ELECTRIC UTILITY
PROGRAMMER/ANALYSTS

RSTS/E PDP 11/70

Engineering-Accounting

Tri-State Generation and Transmission Association, Inc., a supplier of power for 25 rural electric systems, has openings at our headquarters. These positions will be involved with engineering and/or accounting applications using FORTRAN, COBOL, and BASIC-PLUS.

A Bachelor's Degree in Engineering or Math or equivalent combination of education and experience in computer programming and three years of engineering and/or accounting applications programming experience required.

We offer:

- **Excellent Salary and Benefits**
- **Suburban Denver Location**
- **Paid Relocation**

Qualified applicants may send resume and salary history to Peggy Mayer, Tri State Generation and Transmission Association, Inc., 12076 Grant Street, Thornton, CO 80241 or call (303) 452-6111. Outside Colorado call TOLL FREE 1-800-525-0454.

An Affirmative Action Employer

TRI-STATE GENERATION & TRANSMISSION ASSOCIATION, INCORPORATED

COMPUTER PROFESSIONALS

Florida Computer Systems Company

We are seeking professionals to design, develop and program an on-line property information systems.

SYSTEMS ANALYSTS

Previous experience on the design of an on-line property information system and knowledge of IBM or Burrough's small systems.

PROGRAMMER/ ANALYSTS

Three years of COBOL and on-line programming, knowledge of IBM or Burrough's small systems required, CDP preferred.

APPRAISER

Knowledge of property appraiser and tax collector functions, certified, previous experience of on-line systems design desired.

We are a subsidiary of Florida Gas Company and a leader in computer systems for the property appraisers and tax collectors in Florida.

We offer a competitive salary, excellent fringe benefits, and an opportunity to work with sophisticated computer-base appraisal systems. Please send your resume and salary history to:

Director of Human Resources
FLORIDA COMPUTER SYSTEMS COMPANY
P.O. Box 44
Winter Park, FL 32790

PROGRAMMER/ ANALYSTS

If you have one or more years experience in one of the following, we would like to hear from you.

PDP/11 (RSTS/E)
Minicomputer Systems
Accounting Applications
Inventory Control
Application Programming/Design

We are a medium-size computer company specializing in Software Development, OEM Sales and Timesharing. Excellent, modern working atmosphere in a suburban, industrial park within a major metropolitan area. Two in-house DEC systems (11/70, 11/45). We are in market for self-motivated people wanting a challenging career and the opportunity for advancement based on performance, with a fast-growing company. BASIC +, BASIC +2 Languages a plus. All replies held in strict confidence. Forward resume and salary history to:

JSII Dept. 1900
Plantside Dr.
Louisville, KY 40299
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REGIONAL PLANNER II

SALARY: $1571 to $1910/month

The SCAG Regional development Guide Program which generates the So. Calif. Regional Growth Policy seeks a qualified individual to program and run a regional population, housing, employment, and land use information system and to develop related analysis and computer models.

Requires a college degree, three years of experience in programming and developing simple computer models. Must be familiar with fortran or equivalent programming language. Master's Degree in urban planning, computer science or closely related fields may substitute for one year of experience.

Completed SCAG applications must be received by the Personnel Department **on or before February 23, 1979.**

Southern California Association of Governments
600 S. Commonwealth Ave., Suite 1000
L.A., California 90005
(213) 385-1000

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engineer

Large-System Problem Solvers for Amdahl Field Engineering

As a seasoned field engineer or specialist, you've handled a lot of systems problems over the years. You've seen all the major design bugs, power problems, intermittents and "solid down" situations, and have steadily built your reputation as a problem solver through performance. At this point in your career, you may be seeking a chance to demonstrate your capabilities and be recognized for your efforts. Consider this opportunity with Amdahl.

FIELD ENGINEERING SPECIALISTS (AMDAC)

As an F.E. Specialist in AMDAC (Amdahl Diagnostic Assistance Center) your role will include the following assignments:

- **Remote diagnosis of hardware problems via teleprocessing link from Regional Centers to customer locations.**
- **Consultant to on-site Amdahl Field Engineers regarding problem isolation.**
- **Occasional travel to customer sites to assist Field Engineers in resolving critical hardware problems.**
- **Conducting periodic field seminars in relevant technical areas.**

Your background should include the following experience as a Senior Field Engineer or Specialist:

- **Large systems CPU maintenance support on System 360/370; AS/5 or AS/6; CDC 6000/7600 series.**
- **Knowledge of 360/370 compatible control units.**
- **Strong ability to relate to customers.**

Your initial assignment will involve a 6-month intensive training period at Amdahl headquarters, located on the San Francisco Peninsula in Sunnyvale, California. Permanent assignment will be in the Regional AMDAC Center located in the Chicago area, or in other regional locations as we expand our operations.

Consider the opportunity to see immediate results of your achievements. Submit your resume in confidence to Phil Beckhelm, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086, or call him toll-free at 800/538-8460, ext. 6165, or call Rod Dahl on ext. 7174. We are an equal opportunity employer.

amdahl

Burlington Education Center

Sales Training Specialist-Computer Systems

The growth of our business and the demand for increased training programs requires us to look for a professional salesperson with the following:

- a desire to educate salespeople in product, marketing, and sales skills knowledge.
- a minimum of 2 years of successful selling experience in the field of computer systems.
- a background in selling small or medium sized terminal oriented business systems to end user markets.
- with the ability to communicate well in all levels of sales, marketing and management levels within the organization
- a self-starter with a desire to expand your career within this high technology industry.

Please send your resume, including salary history, to Linda G. O'Connor at Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851; or call her at (617) 851-4111, Ext. 2242.

We are an affirmative action employer

Computers

WANG

Word Processing

SYSTEMS DESIGNERS
SYSTEMS
PROGRAMMERS

We have been retained by a major international communications company to locate a number of qualified analysts/programmers and systems architects with communications software expertise.

Individuals will be part of a team building message switching systems for commercial communications network. We seek individuals who have from 4 to 15 years experience in communications software design. Specific experience in message switching, data communications, computer-controlled systems, packet switching, multi-processing, network protocol, system defense strategy, and systems test and integration is desired.

The division seeking this talent is a European manufacturing and service operation with sales of approximately $300 million. The opportunity would require moving to a very desirable location in Europe for approximately two years. Individuals could then elect to remain longer, if desired, or return to a development center in the United States. The company offers excellent benefits and a compensation package that includes an outstanding base salary, a foreign service premium, area cost allowance, vacation premium, home leave (round trip airfare to the U.S. or any equal distance location), a liberal relocation allowance and a tax protection package.

Interested candidates should call or send a resume and current salary requirements to:

heffelfinger associates, inc.
888 Washington Street
Dedham, Massachusetts 02021
(617) 329-1040
Attn: Thomas V. Heffelfinger or John A. Blaney.
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PROGRAMMER/ANALYST (TRADE ASSOCIATIONS)

We are an international management consulting firm with an expanding Trade Association Services practice. We seek a data processing specialist to be responsible for the internal processing of trade association assignments, i.e. manually, in-house computer, or by using external computer services, and to act as liaison between our firm and external computer services. Must develop specialized programs and systems for internal administrative purposes.

Ideal candidate will possess appropriate educational background in computer technology, with exposure to COBOL and basic systems design. Prefer experience in professional service, trade association or hardware/software vendor environment. Replies held in complete confidence; please include salary data.

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797 Washington St.
Newton, MA 02160

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Allen Services believes that corporations, like individuals, have an inherent obligation to contribute to society in general.

Accordingly, we have provided a grant, starting January 29, to help make "The DICK CAVETT SHOW" possible on PBS stations.

We feel this show, which presents a variety of interesting, intelligent interviews, is one of the few that is both thought provoking as well as entertaining.

Headquarters: **212 West National Road**
Vandalia, Ohio 45377
513-890-1200 (In Ohio Call collect)

Atlanta 404-321-0051
Chicago 312-296-0446
Dallas 214-253-3555
Detroit 313-362-4700
L.A. 213-553-1988
Naples, Fl. 813-774-3077
Pittsburgh 412-921-7500
Tulsa 918-494-5010

BAL PROGRAMMER

Manufacturer of Tungsten Carbide Products has an opening for a BAL Programmer. Minimum of 2 years experience with DOS/VS required. Experience on mini computer a plus. Position located in McKeesport, Pennsylvania plant. Liberal fringe benefit package. Salary commensurate with experience. Send resume stating salary requirements to: Personnel Manager, Teledyne Firth Sterling, 4 Parkway Center, Pittsburgh, PA 15220.
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NETWORK ANALYST

WELLS FARGO BANK, a leading financial institution is seeking an extremely competent individual to particiapte in the design of a network utility. Responsibilities will include: working with and monitoring outside consultants and vendors; providing technical input to management decisions concerning implementation strategies; participating in the design and implementation of high level protocols (transport end-to-end, network management, session and presentation control).

The successful candidate will have the following qualifications:

- 3 or more years' experience in the analysis and design of networks, with emphasis on bit-oriented protocols, switching services, routing control and network diagnostics and management.
- Familiarity with packet and circuit switching network technology; routing algorithms, alternate routing, adaptive routing, flow control, security issues, terminal and host interfaces.

We offer an excellent compensation and benefits package. For immediate consideration please send your resume and salary history in confidence to: WELLS FARGO BANK, AU784, P.O. Box 44000, S.F., CA 94144.

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WELLS FARGO BANK

Data Processing

System Analyst

Gilroy Foods, Inc., a leading manufacturer of dehydrated onion and garlic, a major contributor in the growing industrial and institutional food industry, seeks creative self-motivated professionals with 3-5 years' experience who can convert ideas into reality.

The successful candidate will have participated in the development of a comprehensive production planning, forecasting and inventory management system. Current system is an on-line real-time application using bar code readers and HP 3000 computers.

We offer an excellent working environment in the peaceful Santa Clara valley, competitive salary and benefits package. Qualified candidates please submit your resumes and salary history in confidence to Employment Manager, P.O. Box 1088, Gilroy, CA 95020.

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EDP
Systems Manager

Accomplished systems coordinator and EDP problem solver needed to manage online, database operation. Design business applications plus police, library, etc. Analytical, college, and 3 years of programming/systems experience. DEC 11/70 with powerful Admins total software. Salary $23,000. Resume by 2/28/79.

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DATA BASE ADMINISTRATION
SYSTEMS ANALYSTS
AND PROGRAMMERS
Honeywell 66/80

Enhancements to nationwide information terminal system utilizing TPE2 and IDS have created a need for additional data base and application specialists at the headquarters of the largest trade union in the Western Hemisphere.

DATA BASE ADMINISTRATOR - Requires previous experience as a DBA or senior data base analyst/programmer using IDS. Some travel required. Responsible for design, implementation, and support of integrated on-line organization-wide data base utilizing TPE2.

APPLICATIONS ANALYSTS/PROGRAMMERS - A strong application programming background required. Some travel necessary. Transaction processing and/or IDS programming desirable but not mandatory. A challenging position for someone willing to learn.

Openings are at our Washington, D.C. facility. Full TPE2 training will be provided. Offer includes competitive salary, excellent health and pension benefits, relocation expenses, and a professional working environment in a new facility with excellent career opportunities. Qualified applicants are encouraged to send resume, in confidence to:

John Hardy
International Brotherhood of Teamsters
25 Louisiana Ave., N.W.
Washington, D.C. 20001
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SCOTT USA®

A progressive growth oriented sporting good consumer product company, has an immediate requirement for a:

PROGRAMMER/ANALYST

Successful candidates will have 2-5 years proven experience as a Programmer/Analyst utilizing IBM System II with knowledge of RPG II and CCP.

The position is located in our main operations facility in Clearfield, Utah and reports to the Director of Information Systems.

Salary commensurate with experience. Send resumes in confidence to:

SCOTT USA
P.O. Box 1418
Sun Valley, Idaho 83353
Attention: Mike Martin

An Equal Opportunity Employer M/F

Scientific Programmer/Analyst
Pharmaceutical Research

If you're ready for a move up to more challenge and the opportunity for a real contribution toward significant medical research programs, let us hear from you. This is an exceptional opportunity to move ahead with your career in association with our intensive on-going commitment to expanding the horizon of therapeutic investigation.

Minimal requirements will be at least 2 years experience in large scale systems, with particular emphasis on IBM-370 equipment along with OS-JCL and PL1. Degree in Computer Science, Math or suitable scientific discipline will also be essential. Specific experience with medical or laboratory systems and a facility in FORTRAN would be desirable.

This appointment, we feel, has a lot to offer the right person. You'll like our benefits too. Please send resume to: Manager of Scientific Employment, Schering-Plough Corporation, 60 Orange Street, Bloomfield, New Jersey 07003.

Schering-Plough
We Are An Equal Opportunity Employer M/F

DIRECTOR OF COMPUTER SERVICES

Central Wyoming College requires individual capable of operating a one-person computer operation with a Micro-date minicomputer. Responsibilities include analysis, design and programming of administrative systems, training of users, operating hardware and the development of procedures, policies and standards. Applicants should have a minimum of a Bachelors Degree and four years of experience with differing computer systems within a business environment. Must be familiar with systems analysis techniques and the design of common business computer systems such as payroll, accounts receivable, etc.

Salary is $17,000-$21,000. For more information or to apply, contact William W. Day, President, Central Wyoming College, Riverton, Wyoming 82501. Deadline for applications is March 1, 1979. CWC is an Equal Opportunity Employer M/F.

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We are consultants to management. Please send resume and salary history in confidence to: **Gary R. Schultz, One Maritime Plaza—Suite 1350, San Francisco, California 94111. (415) 956-7120.**

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COMPUTER PERSONNEL Consultants
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Bellevue Wa 98005

SYSTEMS PROGRAMMER

We are seeking candidates for Systems Programmer positions. Experience in the support of software of IBM current technology environmental software and/or data communications is desirable; i.e., MVS, TSO, IMS, CICS, VTAM, DOS/VS, etc. However, we will consider talanted individuals not having the desired technical expertise, who aspire to pursue a career involving the developing and support of environmental/communications software.

* Group Medical and Life Insurance
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Federal Reserve Bank Of Dallas

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(214) 651-6122

Send resume to:

Personnel Department
Station K
Dallas, Texas 75222

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JDG Associates is recruiting for several clients in the Washington, D.C., Maryland and Virginia areas in the need of results oriented programmers, systems analysts, and software engineers. Being a professional in one of the fast growing career fields this country has seen, I'm aware of the cirtical shortage of qualified individuals in today's market. All of which enhances your chances of achieving your goals, (the right position at a competitive salary). Take advantage of the excellent opportunities available in the computer field:

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Please send your resume with salary history, in complete confidence to:

Tom Maltby
JDG Associates, Ltd. agency
15825 Shady Grove Road
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(301) 948-6620

BANK SYSTEMS ANALYST

We are a southern New Hampshire bank holding company in the process of expanding our Data Processing facility.

We seek an experienced Analyst preferably with banking or financial background. Duties will include participation in the design and implementation of complete bank central information systems. You will be working with NCR equipment.

We offer a competitive salary commensurate with experience, a complete and comprehensive benefits package, an excellent working atmosphere and an area offering the best in life styles.

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SARASOTA, FLORIDA 33578

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You will have the opportunity to work directly with clients; develop and implement software and procedures; and participate in design and research activities. Knowledge of COBOL is required; other languages (e.g. Basic, Fortran, PL/1, BAL) are highly desirable. A knowledge of computer modeling techniques would also be useful.

Contact PBL Associates, 10 Cottage Avenue, Point Richmond, Calif. 94801 (415) 234-4338.

DATA PROCESSING OPPORTUNITIES

The Medical College of Wisconsin located in a western suburb of Milwaukee, Wisconsin, is significantly expanding its Data Processing functions. Our environment consists of two B6800 mainframes operating with GEMCOS and DMSII supporting a multi-database online network of over 100 terminals. Opportunities now exist in the following areas:

- Operations Manager
- Applications Systems Supervisor
- Senior Systems Analyst
- Senior Analyst/Programmer
- Analyst Programmer
- Operators-all levels
- System Programmers
- User Services Consultant

We offer competitive salary and an excellent fringe benefit package. Send resume stating the position desired:

MEDICAL COLLEGE OF WISCONSIN
COMPUTER CENTER
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We presently have the following opportunities available in a wide range of U.S. cities:

- **APPLICATIONS CONSULTANTS.** Responsible for designing and implementing APL applications and assisting technical and non-technical customers in their successful use of the APL/PLUS system. In some instances may participate in the APL education program. Your qualifications must include at least one year experience in developing APL applications, exposure to business systems, ability to communicate effectively with customers and to contribute effectively with limited supervision. Desirable qualifications are a knowledge of APL/PLUS, EMMA and FPS, and a Bachelors degree with a Masters degree in a field related to computer science or business preferred.
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If you are interested in any of these opportunities, please send your resume to our headquarters office:

SCIENTIFIC TIME SHARING CORP
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Bethesda, MD 20014
Attn: Director of Personnel
(301) 657-8220
EOE/AA MF

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Call, visit us, or send your resume. All inquiries handled with the strictest of confidentiality.

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Must have 3-4 years recent experience operating IBM 360/370/Systems 3; experience in tape, disc, and teleprocessing systems and peripherals; knowledge of RPG II and COBOL required for some positions.

EDP SYSTEMS ANALYST:
Must have 5 years experience in ADP systems analysis; expert knowledge of current ADP hardware/software; qualified in development of data base retrieval systems, complex systems design, and telecommunications; proof of involvement with development of a major automated system; strong background in ADP logistics applications (preferably military supply); familiarity with RPG II, COBOL and Assembly language; knowledge of IBM 360 and System 3;

EDP PROGRAMMER:
Must have 5 years experience in ADP programming; knowledge of current ADP software development techniques; programming for telecommunications/teleprocessing; programming proficiency in COBOL, Assembly language, and RPG II; experience with IBM 370 and System 3.

SENIOR EDP PROGRAMMER:
Must have 8 years experience in ADP programming; knowledge of current ADP hardware/software techniques; programming for telecommunications applications; proficiency in COBOL, RPG, and assembler; proof of involvement with major systems programming effort; knowledge of IBM 370 and System 3; ability to plan and manage large scale projects; BS degree in computer science or math mandatory.

All positions provide excellent salary and benefits which include free housing, low food costs, and liberal leave and vacation. Please send resume to:

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Data processing

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Excellent fringe benefits. Salary to $19,000.

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1395 NW 167th St/Suite 100, Miami, Florida 33169 (305) 625-5433.

Programming Manager

The University of Wisconsin-Milwaukee is seeking a Programming Manager to direct 15-18 programmers specializing in administrative applications in the field of higher education. The candidate must have proven managerial experience, preferably in a university data processing environment, with a thorough knowledge of project management. Ability to communicate well both orally and in writing is important. Sensitivity to the human condition, talent to create a professional environment, and ability to motivate define some of the qualifications for this position. Candidate must have a college degree or equivalent work experience.

Salary commensurate with ability and experience. This is an administrative position reporting to the Director. Please send resume, including salary requirement, by March 1, 1979, in confidence to:

Director
University of Wisconsin-Milwaukee Computing Services Division
P.O. Box 413
Milwaukee, WI 53201
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SOFTWARE SUPERVISOR

Join the management team of professionals directing the City/ County Joint Computer Facility. Current Environment: 370/138, DOS/VS, POWER/VS, and CICS. This is the lead position in a technical support group reporting to the Director.

Responsibilities: Evaluation of new software, assist in selection of future hardware upgrades and resource management planning, generation and maintenance of current software, technical support for applications and Operation's areas, managing software staff.

Requires a background in DOS/ VS operating system and communication networks, a degree or equivalent work experience, current working knowledge of assembler, ANS COBOL, and experience with VSAM and CICS. At least four year's current work experience in software.

Progressive growth organization, plus the opportunity to live in the beautiful Pacific NW. Excellent fringe benefits (most fully paid), current salary to 27K (cost of living review July of each year).

Marion County/City of Salem Joint Computer Facility
690 Ferry St., S.E.
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(503) 588-6351

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Southern California is the home of Southern California Edison, and at SCE we have graet opportunities available for programmers and analysts who are looking for a new career in an exciting new place.

WHY THE DP PROFESSIONAL SHOULD WORK AT SCE!

HARDWARE: SCE has 3 IBM 370/168's and an 850 terminal SNA network, 3 IBM 3033's on order.

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TRAINING: A crucial area for a leading edge shop. Extensive internal and external training in hardware, software, methodologies, leadership and management.

APPLICATIONS: Financial, customer information, material management, property records, construction and others.

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SALARY: Exceptionally competitive! Salaries and advancement based solely on performance.

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(213) 572-1591 Nancy Hughey
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Southern California Edison

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We aggressively support equal opportunity and affirmative action.

SCE

ASSISTANT DIRECTOR

CENTER FOR THE STUDY OF DATA PROCESSING

We are looking for an energetic, imaginative individual to join a university-based data processing educational organization, and take responsibility for the development of professional development programs, seminars, and intensive courses in data processing. The Center for the Study of Data Processing is composed of a select group of individuals dedicated to providing the Saint Louis metropolitan area with a center of excellence in data processing educational services.

The position offers a wide range of opportunities, including:

- interaction with a dynamic metropolitan data processing community;
- an environment that mixes business, medicine, engineering, and arts and sciences computing activities;
- teaching and research opportunities, including the Master of Data Processing (MDP) program;
- computer facilities that include mini-computer networks and micro-computers as well as large traditional (IBM) systems.

We would be particularly interested in candidates who have business experience and a strong desire to join a dynamic academic organization and participate in teaching and research programs. Candidates should have significant experience and/or education in computing or data processing. Salary range is $17,000 to $25,000. Candidates should submit resumes to:

Director, Box 1141
Center for the Study of Data Processing
Washington University in Saint Louis
Skinker and Lindell Boulevards
Saint Louis, Missouri 63130
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Texas Federal Savings

SR. PROGRAMMER/ANALYST

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Our team of professionals needs an experienced programmer/analyst to maintain and develop a variety of programs. ALC experience on IBM equipment is essential.

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Dallas, TX 75225
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PROJECT LEADER MANUFACTURING SYSTEMS ANALYST

Gardner-Denver Company has a Project Leader position for a Manufacturing Systems Analyst. Good organization, communication and project managemetn skills required. Applicant must have good comprehension of manufacturing and production control systems including bills of material, shop routings, scheduling, order entry, shop floor control and master scheduling. Familiarity with MRP systems and Burroughs computer systems helpful.

Position requires 3 - 5 years manufacturing systems analysis with demonstrated abilities in the successful implementation of major systems. A bachelor's degree in related fields a plus.

Excellent benefits and salary opportunities available.

Send resume to:
D.H. Mahannah
c/o Gardner-Denver Company
Gardner Expressway
Quincy, IL 62301

SYSTEMS PROGRAMMER MVS

UOP, a leader in the energy and environmental field is searching for a Systems Programmer with MVS background to join our present staff. The position requires 4 years experience as an OS specialist or the equivalent. Our data center provides services for 50 RJE stations and 45 TSO terminals. Our future hardware plans include an IBM 3033m 3850, and 3800. This is an opportunity to work with the latest software (VTAM, TSO, IMS, DB/DC, BTS 11, ADF, and JES 2). We are located in a Northwest Chicago suburb. We offer an attractive salary and a full benefits package. Send your resume including salary requirements to:

L.S. SCHULMAN

UOP Inc.

10 UOP Plaza
Algonquin & Mt. Prospect Rds.
Des Plaines, IL 60610
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ENGINEERS AND PROGRAMMERS

Lockheed Electronics Company is seeking qualified applicants for immediate positions at NASA's Johnson Space Center in Houston, Texas. These positions are in support of the Space Shuttle and Earth Resource Programs and require applicants experienced in the following areas:

- **ENGINEERING ANALYSTS:**
  Responsible for developing and evaluating math models of spacecraft/aircraft sub-systems including control surface actuators, landing gear systems, etc., for use in large scale digital simulation. Applicants should have a knowledge of FORTRAN and be familiar with techniques for modeling dynamic systems.
- **CONTROL SYSTEMS ENGINEERS:**
  With experience in digital control systems to perform simulation and analysis of spacecraft/aircraft flight control systems. Applicants should have the knowledge of FORTRAN and be familiar with the use of digital and computer analysis of control problems.
- **SCIENTIFIC PROGRAMMERS:**
  Analyze scientific, engineering and mathematical problems and develop numerical models and programs for their solutions on high speed digital computers. Applicants should have a thorough knowledge of FORTRAN and be familiar with the use of large scale computers.
- **SIMULATION APPLICATIONS:**
  Support the development, evaluation and operation of a large dynamics simulation dedicated to Shuttle Flight testing. Applicants should have worked with spacecraft/aircraft GUIDANCE, NAVIGATION AND CONTROL SYSTEMS.
- **MECHANICAL/AEROSPACE ENGINEERS:**
  Responsible for development and use of programs for structural, thermal or environmental Control Systems analysis. Applicants must be familiar with and capable of effectively utilizing large scale digital computers in the analysis of engineering problems.
- **COMMUNICATIONS ENGINEERS:**
  Support performance analysis of various communications and tracking links accessed by spacecraft/aircraft. Applicant should be familiar with TACAN, MSBLS, and HPS Systems, have the ability to develop and evaluate math models, have a high level of competence and written communications and have a knowledge of FORTRAN.
- **DIGITAL DESIGN ENGINEERS:**
  With experience in design and development of digital/analog equipment including computer interface, display control and signal conditioning hardware.
- **COMPUTER MAINTENANCE ENGINEERS:**
  To be cross-trained to support a large, diverse simulation laboratory. Facility includes analog computers, mini-computers and second and third generation medium-to-large scale systems manufactured by several companies.

Send resume in confidence to Bill Jancha at Lockheed Electronics Company, Dept. C-20-35, 1830 NASA Road, #1, Houston, Texas, 77058.

LOCKHEED
ELECTRONICS COMPANY

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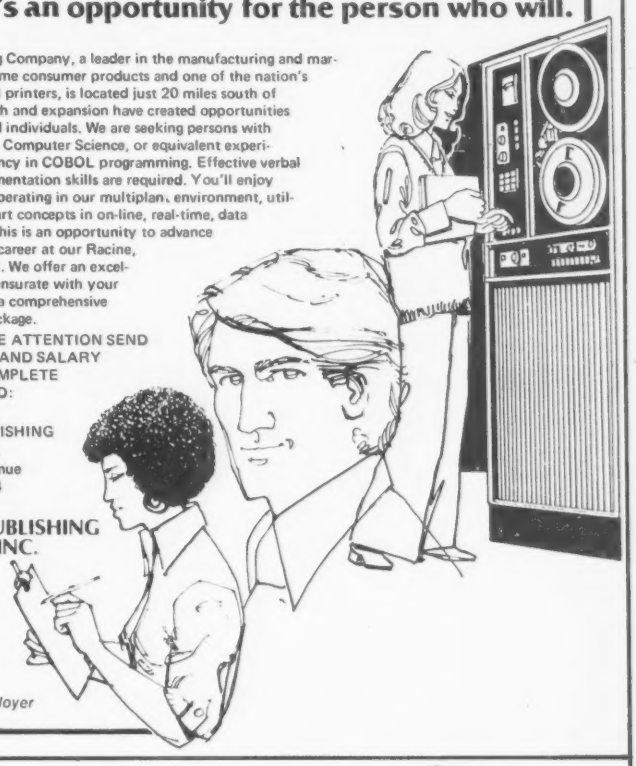
SYSTEMS ANALYST/PROGRAMMER

Not everyone will advance in a career.
But, here's an opportunity for the person who will.



Western Publishing Company, a leader in the manufacturing and marketing of leisure-time consumer products and one of the nation's largest commercial printers, is located just 20 miles south of Milwaukee. Growth and expansion have created opportunities for career-oriented individuals. We are seeking persons with a college degree in Computer Science, or equivalent experience, and proficiency in COBOL programming. Effective verbal and written documentation skills are required. You'll enjoy the challenge of operating in our multiplan environment, utilizing state of the art concepts in on-line, real-time, data base processing. This is an opportunity to advance and explore your career at our Racine, Wisconsin, facility. We offer an excellent salary commensurate with your background, plus a comprehensive fringe benefits package.

FOR IMMEDIATE ATTENTION SEND YOUR RESUME AND SALARY HISTORY IN COMPLETE CONFIDENCE TO:

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By expanding their corporate data center, our client, a Big 3 automaker, has given us the green light to find the most talented DP professionals in the nation.

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- PROGRAMMER ANALYSTS
- SYSTEMS ANALYSTS
- SYSTEMS PROGRAMMERS
- DATA BASE ADMINISTRATORS
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Here's your chance to work with the finest equipment available: IBM 3033's, Honeywell 6080's, IBM 370/168, and a variety of minicomputers.

Their software includes, but is not limited to, COBOL, PL-1, FORTRAN, IMS, CICS, IDS and OS/VS-MVS.

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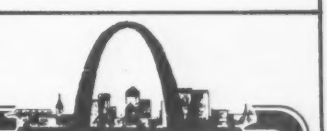

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. . . A SYMBOL OF ACTION & GROWTH

The Gateway Arch in St. Louis commemorates the action and growth of our country's westward expansion. It could also be your gateway to growth and Action.

ACTION Data Services is the leader in providing a sophisticated on-line real time data processing system for the Consumer Finance Industry. If qualified you can help us expand our lead while expanding your career.

ACP

In our forward movement we are converting from PARS/F to ACP, from 2314's to 33XX by developing a new data base structure, and from our national network to Control Data Corporation's international network. Other systems undergoing enhancement are IBM OS, HASP, PANVALET and TSO. If this describes in part your experience and interests, let's review the opportunities for you to become involved in the dynamic activities of our software development team.

IBM/AL

In our application development groups, both batch and on-line, we have positions available for programmer/analysts experienced in IBM 360/370 Assembler language (some Cobol) and financial applications. These positions can lead to group leader, systems design or software support depending on your interests and abilities.

As a division of Control Data Corporation we enjoy excellent benefits, competitive salaries and nationwide opportunities for career growth. Located in suburban St. Louis (Clayton), you can select rural, suburban and urban life styles.

Interviewing begins next week so call or send your resume to B.M. Dann. All resumes are treated with strict confidence and we guarantee a response back to you within a week.

CONTROL DATA CORPORATION

ACTION DATA SERVICES
7822 Bonhomme
Clayton, MO 63122
(314) 862-7700 Ext. 292

We Are An Equal Opportunity Employer M/F

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DATA PROCESSING PROFESSIONALS

Unusual Opportunities

Union National Bank, with over one billion dollars in assets, is seeking experienced individuals to fill positions created by growth in our Data Processing Division. These positions offer outstanding growth opportunities to the right enthusiastic and energetic candidates.

Systems Analyst

Openings for results oriented Systems Analysts with several years of banking background to help develop a long range data processing plan including the design of systems that will lead the industry. College degree or equivalent experience required with some background in operations research techniques helpful. Must have innovative mind, ability to work with upper levels of management and strong leadership skills.

Programmer Analyst

Several openings for talented individuals with COBOL and/or CICS experience to develop systems, lead major development efforts and install major banking/financial management information systems utilizing large-scale IBM hardware and software.

Send resume in confidence to:

THE UNION NATIONAL BANK OF PITTSBURGH

P.O. Box 837
Pittsburgh, PA 15230
Attn: A.W. Hogeland, Personnel Officer
Equal Opportunity Employer M/F

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IBM 370/155 and 370/145 installation utilizing DOS/VS and CICS.

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Math, EDP, Accounting or BBA Degree and three years Systems/Programming experience. Starting salary $16,526.85 to $18,193.55 per annum.

PROGRAMMER

COBOL mandatory. Associates Degree and two years EDP experience or four years large computer system experience. Starting salary $13,693.06 to $15,059.20 per annum.

Immediate openings. Good working conditions and benefits.

Send resume to Director of Personnel, Unified Personnel System, Pinellas County Government, 315 Haven St., Clearwater, Fla. 33516, no later than February 23, 1979.

SENIOR SYSTEMS ANALYST

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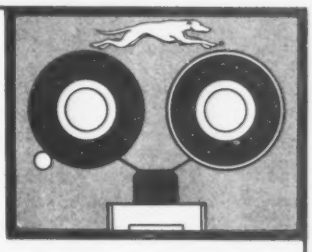

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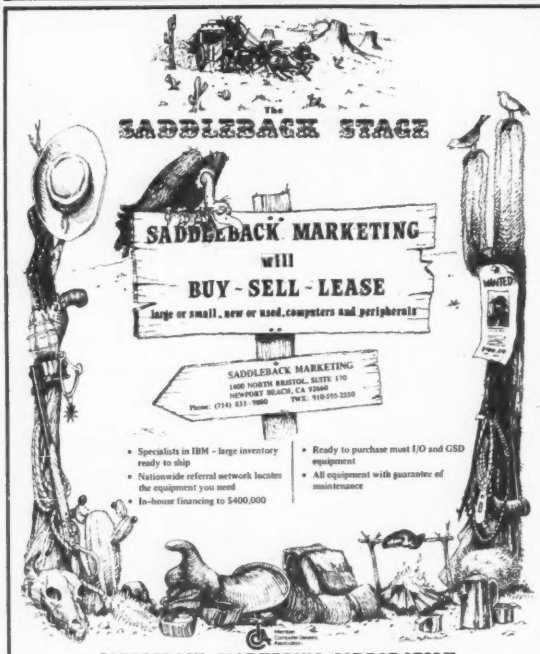
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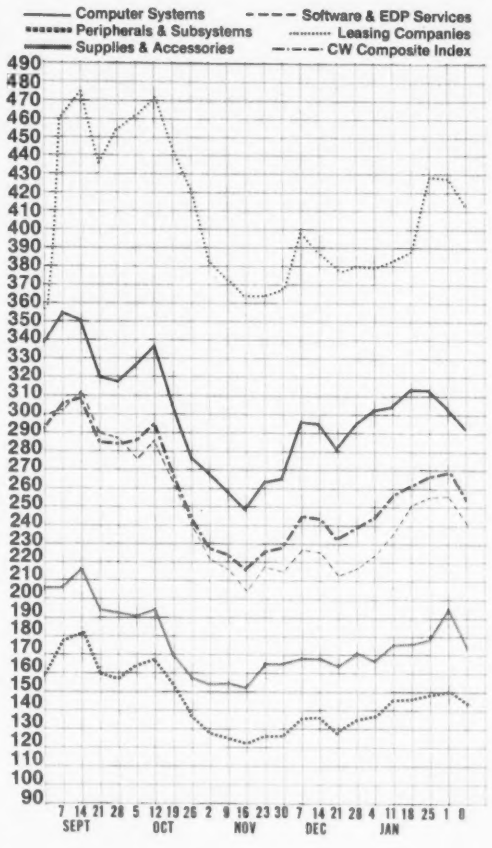

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	1978 (000)	1977 (000)
Shr Ernd	$21.29	$18.30
Revenue	21,076,089	18,133,184
Earnings	3,110,568	2,719,414
3 Mo Shr	6.95	5.38
Revenue	6,438,556	5,038,121
Earnings	1,014,390	797,379

NCR
Year Ended Dec. 31

	1978 (000)	a1977 (000)
Shr Ernd	$11.25	$5.05
b-Revenue	2,610,520	2,311,939
Earnings	318,004	142,470
3 Mo Shr	.34	2.07
b-Revenue	852,970	717,964
Earnings	89,993	59,273

a-Restated. b-From continuing operations.

CONTROL DATA
Year Ended Dec. 31

	1978 (000)	1977 (000)
Shr Ernd	$5.17	$3.65
Revenue	1,867,826	1,512,875
Tax Cred	5,000	583
Earnings	89,464	62,995
3 Mo Shr	1.40	.85
Revenue	538,949	432,343
Earnings	24,210	14,721

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	1978	1977
Shr Ernd	$.96	$.60
Revenue	329,844,000	271,045,000
Earnings	16,350,000	10,200,000
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Revenue	620,546,000	535,027,000
Earnings	26,541,000	19,022,000

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	1978	1977
Shr Ernd	$.17	
Revenue	7,477,377	6,207,713
Earnings	202,889	(88,622)

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 7, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1978-79 RANGE (1)	CLOSE JAN 31 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	28- 69	42 1/4	-2 7/8	-6.3
N	BURROUGHS CORP	59- 87	66 3/4	-3 3/4	-5.3
O	COMPUTER AUTOMATION	15- 44	22 3/4	-1	-4.2
N	CONTROL DATA CORP	23- 44	32 7/8	-1	-2.9
C	CRAY RESEARCH INC	8- 33	26 1/2	-4	-13.1
N	DATA GENERAL CORP	42- 71	59 3/4	- 1/2	-0.8
N	DATAPOINT CORP	34- 75	67 1/2	-2	-2.8
N	DIGITAL EQUIPMENT	39- 58	51 1/2	-1 1/2	-2.8
N	ELECTRONIC ASSOC.	2- 13	7 1/8	- 1/4	-3.3
A	ELECTRONIC ENGINEER.	9- 19	10 5/8	-1 1/2	-12.3
N	FOUR-PHASE SYSTEMS	19- 46	30 5/8	-3 1/4	-9.5
N	FOXBORO	28- 40	30 3/4	-1	-3.1
O	GENERAL AUTOMATION	7- 26	13 5/8	+ 1/4	+1.8
O	GPI COMPUTER CORP	1- 3	1 1/4	+ 1/8	+11.1
N	HEWLETT-PACKARD CO	62- 95	86 3/4	- 1/4	-0.2
N	HONEYWELL INC	43- 76	68 1/8	-2	-2.8
N	IBM	236-316	298 1/2	-10 1/4	-3.3
C	MANAGEMENT ASSIST	9- 29	18 5/8	- 3/4	-3.8
O	MANUFACTURING DATA S	9- 23	20	-1 5/8	-7.5
O	MICRODATA CORP	10- 23	19 1/2	+1 1/8	+6.1
O	MINI-COMPUTER SYST	4- 8	5	- 3/4	-13.0
C	MODULAR COMPUTER SYS	7- 17	16	0	0.0
N	NCR	33- 70	44	-1 7/8	-2.8
N	PRIME COMPUTER INC	20- 43	29 3/8	+ 3/4	+2.6
N	PERKIN-ELMER	17- 31	28 3/4	- 5/8	-2.1
N	SPERRY RAND	33- 49	45	-2	-4.2
A	SYSTEMS ENG. LABS	11- 24	13 7/8	- 7/8	-5.9
N	TANDEM COMPUTERS INC	13- 37	27	-1	-3.5
A	WANG LABS.	12- 36	30 1/2	-3 3/8	-9.9
	LEASING COMPANIES				
C	BOOTHE COURIER CORP	13- 21	18 1/2	-1	-5.1
C	COMDISCO INC	5- 22	19 1/2	-2	-9.3
A	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 1/2	- 3/8	-9.6
O	CONTINENTAL INFO SYS	5- 15	8 1/4	- 1/8	-2.9
N	DATRONIC RENTAL	1- 3	2 1/8	0	0.0
A	DCL INC	3- 5	3 3/8	- 1/2	-12.9
N	DPF INC	8- 14	10	- 1/2	-4.7
N	ITEL	16- 36	22 7/8	-1 7/8	-7.5
N	LEASCO CORP	24- 39	37 5/8	0	0.0
C	LEASPAC CORP	1- 4	2 1/2	- 1/8	-4.7
A	PIONEER TEX CORP	3- 7	3 1/2	+ 1/8	+3.7
N	U.S. LEASING	13- 20	14	0	0.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	7/8	- 1/8	-12.5
O	ANACOMP INC	8- 22	14 1/4	-2 1/4	-13.6
A	APPLIED DATA RES.	8- 17	11 3/8	- 3/4	-6.1
N	AUTOMATIC DATA PROC	24- 36	28 3/4	-2 1/4	-7.2
O	COLEMAN AMERICAN COS	1- 2	1/2	0	0.0
C	COMPU-SERV NETWORK	5- 12	8 1/4	- 1/2	-5.7
C	COMPUTER HORIZONS	1- 9	5 1/2	+ 1/2	+10.0
C	COMPUTER NETWORK	5- 16	5 1/4	-1	-16.0
N	COMPUTER SCIENCES	8- 17	10 7/8	-1 1/4	-10.3
C	COMPUTER TASK GROUP	1- 5	4 1/4	- 1/2	-10.5
C	COMPUTER USAGE	2- 4	2 3/4	- 1/2	-15.3
C	COMPUT AUTO REP SVC	4- 10	7 3/8	+ 1/8	+1.7
C	COMSHARE	6- 19	15 3/4	-1 3/4	-10.0
C	CULLINANE CORP	14- 33	20 1/2	- 3/4	-3.5
O	DATA DIMENSIONS INC	4- 9	4 7/8	- 3/8	-7.1
O	DATATAB	1- 2	1 5/8	- 1/2	-23.5
N	ELECTRONIC DATA SYS.	15- 25	19	0	0.0
C	INSYTE CORP	1- 3	1 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	0	0.0
C	KEANE ASSOCIATES	3- 6	5	0	0.0
O	KEYDATA CORP	1- 3	2 3/8	- 3/8	-13.6
A	LOGICON	10- 19	11 3/4	-1 1/4	-9.6
A	NATIONAL CSS INC	15- 36	26 3/8	-1 1/4	-4.5
O	NATIONAL DATA CORP	7- 13	8 3/4	- 5/8	-6.6
A	ON LINE SYSTEMS INC	12- 30	15	-2 1/4	-13.0
N	PLANNING RESEARCH	4- 10	6	- 3/8	-5.8
C	PROGRAMMING & SYS	1- 1	1 1/8	0	0.0
O	RAPIDATA INC	3- 7	4 1/2	- 1/2	-10.0
O	REYNOLDS & REYNOLD	18- 36	27 1/4	-1 1/2	-5.2
O	SCIENTIFIC COMPUTERS	3- 9	7 5/8	- 1/2	-6.1
O	TYMSHARE INC	18- 34	30 1/4	-2 3/4	-8.3
A	URS SYSTEMS	5- 8	6 1/2	0	0.0
N	WYLY CORP	1- 7	4 3/4	- 1/8	-2.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	14- 32	17 3/4	-5 7/8	-24.8
O	ADVANCED MEMORY SYS	7- 18	13 1/8	-1 1/4	-8.6
N	AMPEX CORP	10- 19	14 1/2	-1 1/4	-7.9
C	ANDERSON JACOBSON	5- 10	6 5/8	+ 1/8	+1.9
N	APPLIED DIG DATA SYS	9- 22	10	-1 1/8	-10.1
C	BEEHIVE INT'L	3- 7	4 7/8	- 1/4	-4.8
A	BOLT, BERANEK & NEW	6- 14	11 1/2	0	0.0
N	BUNKER-RAMO	10- 21	20 7/8	+2 7/8	+15.9
A	CALCOMP	3- 13	6 3/8	- 1/4	-3.7
C	CAMBRIDGE MEMORIES	3- 9	3 3/4	- 3/4	-16.6
N	CENTRONICS DATA COMP	16- 37	30 7/8	-3 1/4	-9.5
C	COGNITRONICS	1- 4	1 5/8	0	0.0
O	COMPUTER COMMUN.	6- 8	9	+1 1/2	+20.0
C	COMPUTER CONSOLES	4- 10	8 1/2	0	0.0
A	COMPUTER EQUIPMENT	3- 6	4 5/8	- 1/4	-5.1
C	COMPUTER TRANSCEIVER	1- 5	3 7/8	- 3/4	-16.2
C	COMPUTERVISION CORP	4- 30	27	- 1/4	-0.9
C	COMTEN	9- 38	25	+ 1/2	+2.0
N	CONRAC CORP	13- 26	14 5/8	- 1/8	-0.8
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 11	8 1/2	+ 1/4	+3.0
O	BALTIMORE BUS FORMS	1- 4	1 1/2	- 1/2	-25.0
A	BARRY WRIGHT	14- 34	14 3/4	-16 1/4	-52.4
C	CYBERNATICS INC	1- 1	5/8	- 1/8	-16.6
C	DUPLEX PRODUCTS INC	13- 30	17 3/4	0	0.0
N	ENNIS BUS. FORMS	8- 17	13 3/4	+ 1/8	+0.9
N	3M COMPANY	43- 66	59 1/2	-2 1/2	-4.0
C	MCORE CORP LTD	26- 34	28	- 3/4	-2.6
N	NASHUA CORP	18- 37	23 7/8	-1 3/4	-6.8
C	STANDARD REGISTER	20- 27	25	- 1/2	-1.9
A	TAB PRODUCTS CO	8- 16	11 5/8	- 5/8	-5.1
N	UARCO	19- 52	51 1/2	0	0.0
A	WABASH MAGNETICS	10- 22	13 7/8	-2	-12.5
N	WALLACE BUS FORMS	18- 33	23 5/8	- 5/8	-2.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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